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Evolution of the Modernisation Plan

THE modernisation plan for British Railways has stood the test of time, in that neither two years' critical scrutiny nor the development within that period of various techniques has necessitated any basic alteration. Nothing, for instance, has caused the British Transport Commission and its advisers to regret the decisions in favour of the vacuum brake, or electrification at 25 kV., 50 cycles. There have been, however, as was inevitable, a shift of emphasis and certain changes of detail. These were among the points made last Monday by Mr. John Ratter, Technical Adviser to the British Transport Commission, in his Presidential address to the London Section of the Permanent Way Institution. A year ago, many railwaymen tended to think of the plan largely as a long-term measure, the execution of which was spread over 15 years. Now there is greater emphasis on a quick return on the resources of money and material expended. Under the Transport (Railway Finances) Bill, shortly to receive the Royal Assent, the Commission is to be lent £250,000,000 on the understanding that its finances shall be balanced by 1962, in contrast to the deficit of £40,000,000 expected for 1956. The improved annual contribution from British Railways which the Commission expects in 1961 or 1962 is £63,000,000 of which £35,000,000 is from modernisation. It is largely on the strength of this estimate that Parliament has approved the loan. Some short-term measures to produce revenue, such as introduction of multiple-unit diesel trains and electrification of suburban lines, are well in hand. As to motive power, the broad decision remains to electrify certain main and suburban lines where traffic and other circumstances justify this—with diesel traction as an interim form of propulsion on some of the main lines and as a permanent feature on others; but development of the techniques of electrification is making the process of conversion constantly quicker, and this factor, with, possibly, availability of cheap and plentiful electric current generated by atomic and coal-fired plants, may well result in electrification of more sections than were envisaged in the White Paper published last autumn. The many matters of detail mentioned by Mr. Ratter included introduction next year of high-speed luxury multiple-unit diesel trains between London and some principal centres, and, in the near future, that of the railbus, with low running costs, and a relatively high degree of passenger comfort.

Steel Consumption

STEEL production continues to rise in Britain, and demands for some types of steel are heavy, particularly for plates and heavy sections. The latest figures issued by the Iron & Steel Board, however, show that demand as a whole has been dropping compared with demand in 1955. In the first quarter of 1956, 8,500 more tons of steel were used than in the corresponding quarter of 1955. This had dropped to 4,500 tons in the second quarter and again to 700 tons in the third. Provisional figures for the last quarter of the year indicate that 4,300 fewer tons of steel were used than in the last quarter of 1955. The change in consumption is attributed partly to less steel being used to increase the volume of work in progress in the metal-using industries than a year ago, when use for this purpose was exceptionally high. Many capital equipment and exporting industries are increasing their use of steel and industries making durable consumer goods have been taking less. This check to the expansion of steel consumption is not likely to continue for long. Notable among those who have taken increased deliveries of steel recently are railway-wagon builders.

B.U.T. Part in Railway Modernisation

CONTRACTS valued at some £1,500,000 have been placed by British Railways recently with British United Traction Limited. They call for diesel engines, transmission units, and driver's controls for incorporation in railcars to be built by British Railways and the Gloucester Railway Carriage & Wagon Co. Ltd. under the 1958 programme. The programme includes 190 power cars and 70 trailer cars with driver's controls to be built by British Railways at the Derby Works, and 96 power cars and 29 trailer cars with driver's controls to be built by the Gloucester Railway Carriage & Wagon Co. Ltd. To meet the demands of the programme, B.U.T. is to supply 572 engines with appropriate transmissions, and 405 sets of driver's controls. The present multiple-unit diesel railcars have proved notably successful wherever they have been introduced, but B.U.T. is now pursuing a regular programme of development of railcar power units for even more arduous duty, and also for lightweight two-axle railbuses of the type with which British Railways are to experiment on hitherto unremunerative branch lines.

Policy for Canals

THE vital importance of a clear and definite policy for canals and inland waterways was stressed by Mr. W. L. Ives, Principal Traffic Officer, British Transport Waterways, in an address to the Metropolitan Section of the Institute of Transport recently. Although the recommendations of the Board of Survey, formed in 1954 under the Chairmanship of Lord Rusholme, a Member of the British Transport Commission, are of great importance

and have led to improvements, the wider questions of canal policy must await the findings of the Bowes Committee, appointed by Mr. Harold Watkinson, Minister of Transport & Civil Aviation, in February, 1956. This committee is still conducting its inquiry. Group I waterways, recommended for development in the Rusholme report, have an operating surplus of some £400,000 a year. The 994 miles of waterways in Group II, comprising for the most part narrow canals, lose some £250,000 a year. These canals are to be maintained to an adequate degree of efficiency, but Mr. Ives admits that costs are such that these canals, without extensive improvements, cannot compete with road movement. The future of Group III waterways, with so little traffic as not to be worth retention for navigation, is a matter for the Government. They should no longer be a charge on transport users.

Reorganisation of Paris Urban Transport

THE deficit of the Paris Transport Authority Régie Autonome des Transports Parisiens (R.A.T.P.) in 1956 amounted to 11,000 million francs (nearly £11,500,000). The R.A.T.P. railway system—the Métropolitain and the Sceaux line, total some 118 route miles. Even with the maximum subsidies which the R.A.T.P. is permitted by law to receive, it has not proved possible to balance its budget, and the draft of a new law was recently put forward by the French Government. It is proposed that the Paris Regional Transport Office (Office Régional des Transports en Commun de la Région Parisienne) should be replaced by a Syndicate composed of representatives of the State, the City of Paris, and the Departments of Seine, Seine-et-Oise, Seine-et-Marne and Oise. Administered by a committee, consisting of three representatives of the State and three representatives of the local communities, the syndicate is to be responsible for the organisation of public passenger transport in the Paris area. In addition, it is planned to reduce the membership of the Board of Management of the R.A.T.P. from its present strength of 28 to 11.

Paris Transport Fare Increases

A BALANCED budget is to be presented to the syndicate showing what fare increases are considered necessary; these latter will have to be approved by the syndicate, and, provided there is no opposition from the Secretariat of the Ministry of Public Works & Transport, they can then be put into operation. When a fares scale which is considered essential for the financial equilibrium of the R.A.T.P. is opposed by the Government, any deficit resulting from such Governmental policy must be covered by a State subsidy. Where an uneconomic fares scale is proposed, and is opposed by the State, the resulting deficit must be covered by a subsidy of which the State will be liable for 75 and the local authorities concerned for 25 per cent. If an increased fares scale and the various subsidies already mentioned fail to balance the budget of the R.A.T.P., a further payment is proposed, of which 50 per cent will be paid by the State and 50 per cent will be shared between the local authorities. It may be that the flat fare—which is relatively high for short distances—on the Métro will at last be abandoned.

Crossing the Water Gaps

AN increase in railway freight and passengers and in road traffic caused by the economic development of Sicily has prompted the latest proposal for spanning the Straits of Messina—by a causeway carrying a double-track railway and a road, with a (presumably) swing or roller bridge over a waterway; in any case, the depth of water in the Straits—said to be some 270 ft. at the shallowest point—makes a causeway, if not, with modern engineering techniques, physically impossible, at least less practicable than a bridge. Even an efficient, intensive train ferry service, such as that of the Italian State Railways between Messina and the mainland, conveying both freight and passenger vehicles, cannot always obviate a serious bottleneck. Hence the building, now in progress, of the bridge over the Ganges at Mokameh, replacing the wagon ferry there, and the decision of the Government of India similarly to bridge the Brahmaputra, probably near Pandu, when the necessary funds and steel can be made available for the work.

Economic and Technical Considerations

SIMILAR factors have resulted in the decision to link the Turkish State Railways in Europe and Asia Minor by a bridge over the Bosphorus, and in the plans for a rail and road bridge to replace the Danish State Railways ferry across the 12-mile wide strait, the Great Belt, and for a railway, partly in tunnel and partly on a viaduct, across the Sound between Copenhagen and Malmö. In general, the density of traffic, availability of funds, evolution of engineering techniques, and, more recently, the growth of road traffic seem far to have outweighed strategic considerations in determining the building of bridges, causeways, or tunnels to close water gaps on important railway routes. Many years elapsed between the completion of the lines on the opposing shores and the construction, for instance, of the Forth Bridge, the Little Belt bridge in Denmark, the Hindenburg Dam between the German mainland and Rügen, the causeway between Singapore Island and the Malayan mainland, the Canso causeway in Nova Scotia, the Severn Tunnel, and the Kammon Tunnel in Japan—nearly all replacing ferries. It will be interesting to see how the process of closing similar gaps, in which British skill and enterprise have led the way, continues.

Corrugated Rails

ONE of the problems confronting the railway civil engineer is the maintenance of a smooth rail surface free from corrugations. The problem is not peculiar to any one country or to any individual railway, and several devices have been developed to avoid the expense of defective rail replacements. During the early 1930s Fried. Krupp Lokomotivfabrik developed rail grinding cars suitable for light service, and in 1954, a motorised rail grinding unit built by this firm was introduced on the German Federal Railway. The machine, described in our issue of November 5, 1954, incorporates a hydraulic device to prevent overloading of the 24 grinding wheels, 12 for each rail. The 24 wheels together can remove corrugations of maximum depth of 0·018 in. from each rail in a single pass. Working on an entirely different principle is the London Transport rail grinding unit, details of which are given elsewhere in this issue. In this case, the design follows closely that of the French National Railways rail grinding train, described in our December 7, 1956, issue, which uses grinding shoes. Both the London Transport and S.N.C.F. trains operate at approximately 30 m.p.h., while the German Federal Railway train operates at 1·8 m.p.h.

A Useful Cycle Inspection Trolley

THE Indian Government Railways have evolved a 5-ft. 6-in. gauge cycle inspection trolley weighing 286 lb. It consists of four parts, the inspection seat, the frame, and two sets of wheels and axles, quickly able to be dismantled and loaded into a brakevan. The frame is of welded seamless tubing 1 in. in external dia., the sides and ends being stiffened by trussed frames. A motorcar type of band-and-drum brake is provided and is controlled by a hand lever beside the inspection seat and a less-powerful foot lever worked by the cyclist-trolleyman. A single crank-gear and standard-length cycle chain with adjustment for length and tensioning are fitted. The front axle is partly tubular and partly solid, and the back one is solid and stiffened against deformation, due to the chain-drive tension, by a ball-race bearing against a buckle-plate attached to the frame. Springing is provided by a twin set of helical springs above each horn guide, the whole forming part of a framework fitting easily the ball-bearing

casings on the axles. An awning is fitted, and the cycle-seat folds down when not in use. A smaller and somewhat similar metre-gauge trolley weighing 280 lb. carried nine men, weighing 1,170 lb., and averaged 8 m.p.h. for 20 miles on trial, two trolleymen undertaking the pedalling alternately.

Dynamic Strain Recording

RESISTANCE strain gauge measuring apparatus was developed by the Southern Railway in conjunction with Savage & Parsons Limited, to determine the amount of oscillation caused by the use of axle-hung nose-suspended motors in multiple-unit trains, which were believed to be adversely affecting the track. The apparatus was first delivered in 1948, after nationalisation, to what had become the Southern Region of British Railways. Since its placing in service, use of the equipment has been extended to a variety of other investigations. For instance, rail bending stresses have been investigated in connection with various types of rolling stock and methods of suspending motors. In the light of the results of these tests, a form of traction motor suspension has been developed for multiple-unit stock which gives a degree of resilient support for the motor without the complexity of a fully resilient motor and drive. Tests were also carried out on electrical equipment for multiple-unit trains, and, on behalf of London Transport, on the measurement of stresses in a L.T.E. bogie frame. A description of the equipment is given elsewhere in this issue.

Interlocking Block for Single Line

SOME correspondents in India have put forward to us suggestions for constructing interlocking block circuits for single-line operation, eliminating the use of tokens of any sort. Such working is, of course, well known in principle and even much used, with various forms of apparatus, in some countries, especially on the Continent. Provided certain absolutely essential safety conditions are complied with, including very strict control over the use of any emergency re-setting or releasing apparatus, where provided, reliable and speedy traffic operation is attainable with equipment of this class, as experience on several railways shows. There are, admittedly, reasons which tend to render anything of the kind attractive in India or countries having comparable operating conditions. The minimum requirements needing to be met by any satisfactory single line interlocking block have been recognised for a long time now and it remains to be seen whether the particular way of fulfilling them suggested by our correspondents receives a practical trial at the hands of some management, a step which would be of much interest.

Gone with the Wind

PASSENGERS by the French National Railways "Mistral" express may one day find their passage through the barrier obstructed by journalists queuing for a ride in the cab. A recent writer on this popular subject was driven by a Monsieur Dupont, whose "right hand from time to time rolled him a cigarette" while travelling at a steady 87 m.p.h., and whose fingers presumably from time to time flicked the ash into the ashtray of his aunt. Generations of Dupont, in thousands of school primers, have introduced Englishmen to the mysteries of the French language, and now the indefatigable family is opening its eyes to the shortcomings of British Railways, for this and other articles on "Mistral" cab rides hint persistently that if our own drivers were to travel continuously at 87 m.p.h. they would hardly consider it an event to be dismissed nonchalantly by rolling a cigarette. It is difficult to counter these innuendoes that they order this matter better in France. The various correspondents who stream South with the "Mistral" are merely adding railways to cooking, gallantry, and the weather. Tradition compels them to prefer the dashing Dupont and his cigarettes to a Mr. Murgatroyd who smokes a pipe on the run from Sheffield to Manchester.

Operating Aspects of Modernisation

THE paper read to the Railway Students' Association last week by Mr. L. W. Cox, Chief Operating Superintendent, London Midland Region, British Railways, entitled "Modernisation on the Railways as particularly affecting the Operating Department," is valuable as giving a summary of modern thinking on operating problems. Pointing out that the modernisation plan stresses safety, speed, and comfort, in that order, he gives the outstanding methods adopted to achieve those ends as the decision on future methods of traction, the decision to fit continuous brakes to all freight stock, the decision to provide automatic train control equipment, modernisation of signalling installations, improvement in permanent way layouts, and modernised terminals.

The operating repercussions from the use of both diesel and electric traction have some similarity. Both permit more intensive use of power units, so that much tighter diagrams can be prepared for their use. By their ability to work for long periods without returning to shed, they reduce light running and, in consequence, line occupation at busy points. This factor is further enhanced by the ability of multiple-unit trains, both diesel and electric, to run in either direction. Bearing in mind that the speed of a train is governed by its ability to stop, it follows that by substituting continuously-braked trains for those now run with non-fitted stock, the pattern of the transit of goods by freight service will be completely changed. To obtain the maximum advantage from the new conditions it is essential that the average length of haul between stops shall be increased, and, wherever possible, through runs from loading to discharging point must be obtained. He envisages only two main classes of freight trains—an express goods and an "express" mineral—with combination of the two classes on some sections of line. The greater concentration of equally-graded traffic will make it possible to run through trains from and to places which have never had such services before. Concentration of traffic at new and improved terminals will help in this process. Because it will be possible to intersperse freight and passenger trains, the movement of freight can be performed in other than the night hours if necessary.

The design, siting, and working of marshalling yards will be influenced greatly by these developments, and a fairly extensive programme of modernisation of some yards, closing of others, and building of new yards already is in hand. Mr. Cox makes the important—and sometimes overlooked—point that an existing yard cannot be completely modernised unless satisfactory arrangements can be made for dealing with traffic which normally passes through the yard during the period of reconstruction. Before a yard can be designed, an estimate of the traffic it will deal with is required. This must be in detailed terms indicating the source, destinations, and quantities in order that the yard can be laid out to accept inwards trains, sort, and re-marshal the wagons with the minimum of movements. With the greater emphasis on longer hauls between stops, and less staging of traffic, the savings from the closure of numbers of small yards can be set off against the high cost of new yards. In the immediate future, however, the marshalling, breaking-up, and re-marshalling of continuously-braked trains will take more time than has been taken with non-fitted trains. Although there are indications that an automatic coupling may be developed and put into general use in the near future, the cost of combining this with the coupling of the brake system may well prove prohibitive. One of the results of this longer time spent at marshalling yards may be the need to provide additional reception and departure sidings. Mr. Cox illustrated his remarks on marshalling yards with diagrams showing a yard with a single hump, designed to deal with both up and down traffic where an even flow throughout the 24 hr. can be obtained, and a double yard with two humps for heavy or uneven traffic flows.

To make the best use of the higher speed at which trains will be able to run, a continuously track-circuited, colour-light signalling system is desirable. With the extra pro-

tection of automatic train control, this will allow speed with safety. More efficient train regulation will arise from the combination of scattered signalboxes into one central box at suitable places. It is probable that more frequent signals will be needed on the track and it may be necessary to use a "speed" indication other than the normal yellow or double yellow. Tracks themselves will have to be upgraded, particularly goods lines, to enable them to carry faster and denser traffic. In some cases, additional tracks may be needed, and in others tracks may become redundant. To make them capable of receiving trains currently, many terminals must be improved and traffic concentration schemes intensified to enable the number of through trains to destination to be increased.

On the introduction of new types of motive power, Mr. Cox comments that there is an interim period in which traffic operators have to deal with "mixed loads"—steam, diesel, and electric. Diesel schemes can be produced fairly quickly, but implementation depends on the delivery of equipment. Isolated schemes have to be produced which later will be dovetailed into a general pattern. As to 50-cycle electrification, this presents many technical problems. In the London Midland Region, the Styal line sector between Crewe and Manchester is being used for trials.

The new timetables, it has often been stated, should be based on regular intervals and the use of standard train formations with maximum utilisation of locomotives, rolling stock, and train crews. Factors at present operating against these proposals are requirements of paths for special trains; passenger terminal capacity; junction layouts; the need to provide through portions on expresses; the conveyance of mails, and so on, on passenger trains; and the characteristics of the steam locomotive. Some of these will be overcome by the modernisation plan, and through facilities might be cut out by the provision of fast services with quick connections, intermediate stations being served from the main-line stops by semi-fast and slow services. Mails must now, under contract, be carried by any passenger service, and certain other goods must, in practice, be so carried. Transfer of such traffic interferes with the provision of quick connections, and is a problem which should now be tackled. In conclusion, he makes a plea for still greater use of modern telecommunications, and declares that with the modernisation plan now begun, with the development of industry in general, with the coming of the electronic age and new sources of power, the scope for revitalising railway transport is immense.

Speaking in the subsequent discussion, Sir Brian Robertson, Chairman of the British Transport Commission, emphasised that new methods as well as new equipment were necessary. It was often easier to order new equipment than to produce these new methods. It was essential that departments, particularly the operating and commercial departments, should work together. Present methods of freight-handling, he declared, now that manpower was neither easily obtainable nor cheap, were too expensive—the traffic would not bear the cost. The year 1957 would be a critical one for British Railways, a year in which great changes would be made and there would have to be great decisions.

Operating Problems 50 Years Ago

A COMPARISON between the problems of half-a-century ago and those of today can be drawn from the paper by Mr. Cox and one sent us by Mr. Trevor Roberts, who retired in 1942 from the position of Divisional Traffic Superintendent, Newport, Great Western Railway, and is still in vigorous health. The latter paper, on freight train working, was given by him to the Great Western Railway (London) Lecture & Debating Society on February 14, 1907. Even then, the point was being stressed that one of the essentials of sound freight train working is punctuality, which tends also to economy. He made a special point of the good working of long-distance goods trains with full loads from starting point to three or four destinations within a close radius. Express vacuum-fitted freight trains, apart from fish and meat trains, were run as early as 1905 and extended to all the G.W.R. trunk routes in and out of London. They were of 40 wagons, with 25 per cent vacuum-fitted, and ran at average booked speeds of 35-38 m.p.h. The wagons had to have oil axleboxes, or, if grease boxes were used, were examined at a special stop for the purpose. There were even faster freight trains, such as the Fishguard-Paddington night express, which was fully fitted. This train covered the 286½ miles to London (via Gloucester) in 9 hr., with stops at Landore, Cardiff, Gloucester, Reading, and Acton. Fish and meat trains, fully-fitted, also ran at high speeds. The 1.40 p.m. from Penzance covered the 246 miles from Plymouth to Paddington in 8 hr. 10 min. with several stops.

He pointed out that the vacuum brake gave the necessary brake power to be able to stop with reliability at high speeds and that in the U.S.A. all freight cars were fitted with a continuous brake—as they had been for some years. Shunting operations with fully-fitted trains, he commented, took longer as brake pipes had to be connected and screw-couplings tightened up. "These items operate against their rapid manipulation in shunting yards." This particular problem is one which, half-a-century later, is still exercising the minds of operating officers in Britain. Mr. Roberts was in favour of bigger trains, which, he maintained, tended to bring about a reduction in aggregate engine-hours and a proportionate reduction in the hours of train crews. The number of trains would be reduced, and line occupation be correspondingly less.

In 1907, he was already showing that larger-capacity wagons could not be introduced everywhere because coal tips, weighbridges, colliery appliances, and so on had been laid out for small wagons. In 1957, this is still one of the great difficulties to be faced in introducing large wagons. He put the amount of coal carried annually by railways in Britain at that time at some 160,000,000 tons. In 1955, the last complete year for which figures are available, British Railways carried 166,000,000 tons. In 1956 it was some 168,000,000 tons. The modern conception of "loadability" of goods was foreshadowed by the Great Western idea at that time of building vans—still of 10-ton capacity—with larger bodies, enabling a greater volume of light goods to be carried in the vehicle. Mr. Roberts thought that open wagons of larger cubic capacity should be built. He also advocated the use of gravitational marshalling yards, which were just coming into favour, but thought there were few concentration points on the Great Western where these could be used to advantage.

Such papers as that of Mr. Roberts were by no means rare. Many present-day ideas now under discussion are echoes of those proposed long ago. New equipment apart, it is indeed surprising that operating methods have changed so little. The interval services and even speeds looked forward to today have been the dream of operators for very many years.

Motive Power Problems in China

THIRTY years ago China was one of the most interesting countries in the world from a locomotive point of view, for on her railways could be seen locomotives of British, American, French, Belgian, Japanese, Dutch, and German design and manufacture, many of them equivalent in power, age, and type, hauling similar trains over the same lines. In such circumstances the best possible opportunity was given to locomotive engineers to study and standardise whatever was found the best features of design and manufacture from the locomotives of each country. The officials of the Ministry of Railways took full advantage of this during the 1930s, and a range of standard designs was being evolved when the Sino-Japanese war brought matters to a halt. As the Chinese retreated before the Japanese, they removed or destroyed the locomotives in their possession and as a result the Japanese found it imperative to build or obtain large numbers to fill the gap. The South Manchurian Railway, the undertaking controlled by the Japanese Government which had dominated

South Manchuria since the Russo-Japanese war, had brought out, about 1930, two designs for passenger and freight work. These were of 4-6-2 and 2-8-2 design with equivalent boilers and some interchangeable parts and had tractive-efforts of about 29,000 lb. and 37,000 lb. respectively. Both types followed American design current at the period.

These two designs, with some modernisations, were built in large quantities for service all over Eastern China. After the Japanese collapse in 1945 there seemed no good reasons to transfer them elsewhere, in exchange for the locomotives formerly used, and as a result they are today almost the sole types to be seen on the railways of China proper. Many of these locomotives were built by the Japanese at the South Manchurian Shops in Dairen, and when the Chinese took over these shops, they wisely continued to build these well-tried types until new designs could be got out.

China now requires larger locomotives, for the steady increase in the traffic has caused line saturation on many sections, and longer trains are the only way of increasing the movement of tonnage short of doubling the track; 600-ton passenger and 3,000-ton freight trains are already standard over most of the main lines, and the present locomotives are thus working near their maximum on all but very lightly graded lines. On the Nanking-Shanghai line, where traffic is exceptionally heavy for a single track, some relief has been provided by loading passenger trains to 800 tons and transferring the 4-8-4 type engines built for the Canton-Hankow line to Chinese specifications by the Vulcan Foundry Limited in 1935, while freight trains are sometimes double-headed. It is these conditions which have made larger locomotives inevitable, and the 2-10-2 type, which is described elsewhere in this issue, is the first result.

British Railways 1956 Statistics

(*By a North Eastern correspondent*)

A NOTE in No. 13 of *Transport Statistics* warns that restrictions on oil supplies affected figures for the four-week period to December 30. The impetus given to freight train traffic in the early days of petrol rationing was not pronounced. The tonnage of 21,163,000 originated by British Railways was 128,000 tons, or 0·6 per cent, above the lean year 1955 but over a million tons below 1953 forwardings. After a persistent decline in merchandise carryings over the past five years, a rise of 68,000 tons on 1955, or 2·1 per cent, brought the tonnage to 3,291,000 against loadings of 3,773,000 tons in 1953 and over 4,000,000 tons in 1949. A decline in minerals of 199,000, or 3·9 per cent, brought the December tonnage down to 4,896,000 tons, or nearly to the low level of 1954.

Coal and coke declarations improved by 242,000 tons, or 1·9 per cent, to 12,930,000 tons, but were fully 5 per cent behind the 13,643,000 tons declared in 1953. Obviously the railways had much spare capacity for freight movement available at the close of last year, but the temporary shortage of fuel oil had more influence on the volume of railway traffic in January.

1956 Operating Statistics

The results of railway operations in 52 weeks of 1956 are now known and will not differ materially from the results for the whole year. A tonnage volume of 275,818,000 was 1,939,000 larger than in 1955, but about 12,625,000 below the 1953 level. Merchandise accounted for 42,294,000 tons, a decrease of 1,055,000 from 1955 and of around 6,354,000 tons, or 13 per cent, from 1953. Mineral tonnage was 1,437,000 tons over 1955, despite a fall in the second half of last year. The quantity of coal and coke declared was 1,560,000 tons above 1955, but about 7,000,000 tons below 1953. The growth of heavy traffics took place mainly in the London Midland and North Eastern Regions.

Because of a shorter average haul, net ton-miles expanded more slowly than tonnage. Last year's aggregate went up by 102,746,000, or 0·5 per cent, on 1955, though fully 5 per cent beneath the 1953 level. In coping with the increase, British Railways ran 1,370,000 more freight train-miles, an increase of 1 per cent. Freight train engine-hours in traffic were, however, cut by 213,000, or 1·4 per cent. With a train load of 159 tons, about a ton less than in 1955, freight steam train speed improved slightly from 8·8 to 9 miles an hour.

Speed and load factors combined to advance the hourly output of freight train operation by 1·8 per cent to 1,183 net ton-miles per train engine-hour. This significant statistic has risen gradually from 1,053 in 1948, but was still 16 points behind the 1938 output of the L.N.E.R. Company's North Eastern Area. Last year the North Eastern Region retained the lead in productivity by turning out 1,464 net ton-miles in a train engine hour. The Eastern Region was its keenest rival, raising its output by 39 points to 1,385, no less than 28 per cent above the Western figure of 1,082 and 19 per cent above the London Midland figure of 1,160. Since 1950 the Western Region statistic has retrograded. It was then 53 points above the all-line average and the London Midland result was 63 points below the average. Last year both Regions were short of the average, the Western by 101 points and the London Midland by 23.

Rolling Stock

At December 30, British Railways had a total stock of 18,173 locomotives. As 490 steam locomotives were in store, the net operating stock was 17,683. Of 17,004 steam locomotives, 2,519, or 14·8 per cent, were under repair. Diesel-electric locomotives numbered 512, but only 459 were serviceable. Of 94 diesel (mechanical and hydraulic) locomotives 10 were under repair, as were 6 of 71 electric locomotives. The number of locomotives available for traffic was thus reduced to 15,093, against 15,230 at the end of 1955.

The serious feature of the present motive power position is the failure of diesel locomotives and diesel multiple-unit passenger carriages, of all types, to stand up to traffic requirements. Our railways cannot afford to have over 10 per cent of these new and expensive machines constantly idle, as was the case last year.

The stock of freight vehicles at December 30 was 1,117,464. The number under repair was 60,573, or 5·4 per cent, so that 1,056,890 vehicles were available for traffic working. That was an increase of 7,480 on the available stock at the end of 1955. It is probable that there was a fairly large surplus of wagons at times last year, because wagon loadings were 454,000 fewer than in 1955 and about 3½ million below loadings in 1953, when the railways owned 10,350 fewer wagons and the tonnage capacity of the entire stock was about 4 per cent less than it is today. Last year loaded wagon miles were 48 million fewer than in 1955 and 353 million below the 1953 total, a fall of 11 per cent; rolling stock controllers should therefore have been able easily to meet all demands for ordinary wagons.

The Outlook

It is to be hoped that British Railways reached their lowest stage as freight carriers in 1955 and 1956. The prospects of an upsurge in 1957 traffics depend largely upon the ability of the National Coal Board to keep the output of coal at or above the level reached in the four weeks to February 9. Coal started our first railways and is still the principal commodity put on rail in this country and in the U.S.A. Coal and coke will be in keen demand this year, as the iron and steel industries are bent on making fresh records in production. The shipbuilding yards want more and larger steel plates, while the building of nuclear power stations needs special steel, such as the Consett Iron Works made for Calder Hall. There should be no lack of heavy traffic for British Railways, but they may find difficulty in retaining light goods which happen to be diverted from road to rail transport until the supply of oil fuel is normal again.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Design of Passenger Rolling Stock

February 12

SIR,—It is unfortunate that outdated designs and materials are still being used in the British Railways prototype coaches described in the article in your issue of February 8. A chassis-less, load-carrying body minus centre door would be lighter and stronger than a separate underframe and unstressed body, particularly if constructed in high-strength low-alloy steel.

Riding would be greatly improved if equalised trucks incorporating hydraulic dampers in the bolster springing were included. Roller bearing axleboxes and brake rigging slack adjusters would be additional improvements giving greater reliability and safety.

It is of little value to revise body detail, internal decoration, and layout, if outmoded fundamental components are used.

Yours faithfully,

B. T. SCALES, B.SC. (ENG.)

132, Burnham Avenue, Ickenham, Uxbridge

February 11

SIR,—It was interesting to read in your issue of February 8 of the enterprise of the British Transport Commission in trying to add to the comfort of its passengers. May I suggest certain fundamentals desired by passengers? They are: Smooth running, good heating and ventilation without draughts, cleanliness, seating that will give a reposeful position to average-size persons rather than to the minority of passengers with long legs, and good lighting for reading.

The first three of these are usually provided when the vehicles are new, but, when good maintenance is not easy, very close attention should be given to bogie and suspension design, even to the extent of spending more on it initially. There is nothing more irritating and consequently exhausting than a rough running vehicle.

In the present standard British Railways vehicles both lighting and ventilation are good and seem to remain so. In non-corridor, open coaches, greater consideration might be given to non-smokers, by providing more effective partitioning. Cleanliness, too, is reasonably good, though some lavatory details might be better designed to withstand the inexpert efforts of present day cleaning staff. Elaboration, such as provision of separate toilet compartments for men and women, is much less important than proper cleaning.

As for the design of seating, softness is secondary to shaping that will give support to the normal human frame. As women, who seem to travel as extensively as men, are usually of shorter stature than men, it is preferable that seat width should be too narrow rather than too wide, as so many are at present. A short person on a seat that is too wide cannot get proper support for the small of the back where support is so important, especially on long journeys. Too narrow a seat does not inflict corresponding discomfort on a tall person. Similarly, too high a seat should be avoided; it is better to have it low enough to let the feet of shorter persons rest comfortably on the floor.

As to the seat back, while a reasonable degree of resilient softness is desirable for the seat, which carries the main weight, the back should give firm support rather than yield too much; and it should slope in such a way as to give main support to the small of the back when the seat itself is compressed by the weight of the body.

To judge by the photographs you reproduce of the Metro-Cammell prototype first class compartment, the designer of the seats has considered these points to good effect. What he does not seem to have realised, though, is that only the thinnest padding is necessary for the back of the head, whose main weight, in a sitting posture, is taken by the spine, and would, therefore, never compress what looks like at least a 3-in. thickness of cushion, the elimination of which could save a good 6 in. in the width of the compartment.

The old L.N.W.R., in the early days of this century and before, had probably the most reposeful seating in both first and third classes, though it was not particularly soft. Those responsible for the prototypes yet to be completed might do worse than study it. Too much trouble could not be taken now if the adopted design is to be standardised for thousands of new vehicles.

The present standard British Railways stock is reasonably comfortable for the average second class passenger, though the lower part of the squab might well slope more at the expense of the seat width. As to the first class seating, it must have been designed under the impression that the British well-to-do are a race of supermen which, in the physical sense, they are not.

A long railway journey is usually said to be tiring. It often is; but the main reason is the neglect of designers to produce reposeful vehicles. What all-round satisfaction would be given if this opinion of travelling by train were reversed!

Yours faithfully,

W. A. WILLOX

Edstone, Wootton Wawen, Warwickshire

Steam v. Diesel

February 7

SIR,—A question troubling the minds of many living in the Western Region of British Railways is: Is this the time to talk of conversion to diesel of all motive power in our Region and in all marshalling yards? The blocking of the Suez Canal should have warned the British Transport Commission of the great danger of placing vital railway services at the mercy of foreign sea-borne oil. Whatever the B.T.C. scheme for adopting diesel traction was when it was conceived, it is now basically unsound, and indeed a national danger.

When every other user of diesel oil is rationed, even such a vital industry as agriculture, why are British Railways scrapping useful steam locomotives and putting more and more diesels into traffic, so aggravating the oil position? The diesel locomotives cost three times the price of equivalent steam locomotives, and their life will be roughly one-third as long. They need a far higher standard of maintenance. Now oil fuel is rising in price, and supplies cannot be guaranteed.

If the scheme for progressive introduction of diesel traction goes forward, it is essential for the sake of security that no more steam locomotives be broken up. A full complement of steam locomotives must be retained in good running condition as a stand-by. This means a reserve of firemen, and, therefore, added expense.

When we examine the claims made for the new diesel multiple-unit trains, it is clear that the diesel motive power has little to do with their success and the increase in passenger traffic. The regular interval service and otherwise greatly improved timetables are responsible. It has been proved in the Western Region in South Wales that steam push-and-pull trains can do everything that a diesel can do, and equally well, if comfortable passenger vehicles and suitable engines capable of quick acceleration are used. The old G.W.R. built engines for push-and-pull services capable of any service performed by the much-vaunted diesel train: the 5400s, 6400s, and auto-fitted 4500s.

Yours faithfully,

ARTHUR J. MAXWELL

31, Gloucester Road, Newton Abbot, Devon

THE SCRAP HEAP

Tumbleweed in Texas

A new use for tumbleweed has been found by engineers of the Texas & Pacific Railway, a subsidiary of the Missouri Pacific Railroad Company. Held in place by rows of wire fencing on each side, it prevents loose sand from being blown on to the railway lines.

First Class Look

During the war I travelled overnight, with a friend, from London to North Wales. Our tickets were third class. At Crewe we had to change trains, and fought our way, in total darkness, with hundreds of other passengers, from one platform to another. From Crewe to Chester we stood in a packed corridor, and at Chester changed again. When we arrived at Bangor, at about 5 a.m., neither of us can have looked very distinguished. Nevertheless, without a word from me, a station official hastily unlocked a first class carriage in the little local train, ushered me in, leaving my friend on the platform, and firmly locked the door behind me. Could it have been that in spite of my appearance (and my third class ticket) he recognised in me an essentially first class passenger?—*From a letter to "The Manchester Guardian."*

Hunt Travels by Rail

Like other hunts, the Suffolk Hunt normally uses road transport when travelling to a meet; but because of petrol rationing a special train was provided by the Eastern Region on February 9, to convey horses, hounds, huntsmen, and hunt followers with bicycles from Bury St. Edmunds to Mellis. Thirteen horses and 18½ couple of hounds were loaded at Bury St. Edmunds and another three horses at Elmswell. After a good day's hunting, the hunt returned to Elmswell for conveyance back to Bury St. Edmunds. Loading and unloading were carried out smoothly and the joint Masters expressed their complete satisfaction with the arrangements.

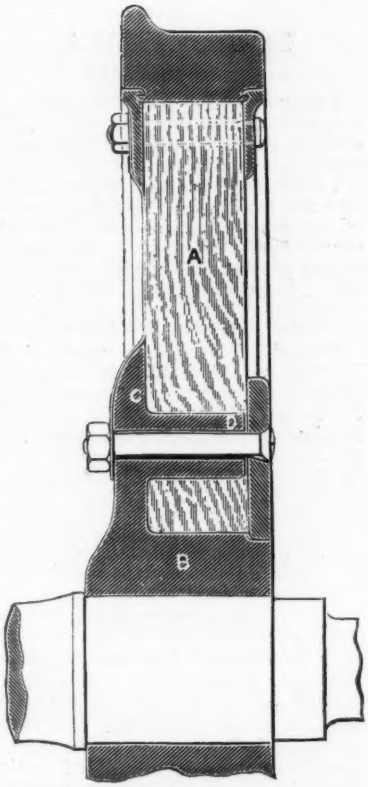
Electrification to Southend

Answering a shareholder at the London, Tilbury & Southend Company's meeting, the chairman admitted that the cost of electric traction was dearer than steam traction. Electric traction was still in an experimental stage, but there were now indications that the cost was being reduced.—*From "The Evening News," February,* 1907.

[The view that railway electrification, in 1907, was "still in an experimental stage," seems to have been wishful thinking. The history of the electrification of the two routes from London to Southend is referred to in an editorial article in our issue of December 28, 1956.—ED., *RG.*]

The Stroudley Wooden Carriage Wheel

The carriage wheel devised by William Stroudley in 1870 for the London Brighton & South Coast Railway stood up to shocks and continuous brake action. A correspondent states that it was made of cast iron, wrought iron, and wood. The contemporary drawing reproduced, right, shows four wood sections (A) which were held in place on hub (B) by boss (CD) with outer hub plate, bored through and fixed with heavy bolts. The wood sections were made fast to the rim by a strong wrought iron ring plate on each side. This wheel was very strong and it reduced vibration in the rail cars to a great extent apart from the other mentioned advantages. The wood used in the web sections was the best well-seasoned English oak. One vehicle fitted with this wheel was still in use in 1910.



Section through Stroudley wheel

The Suffolk Hunt detraining at Mellis

Farewell to Steam

(*See Publications Received, page* 217)

"Farewell to Steam," writes Canon Lloyd,
Whose pen has often been employed
In sticking up, with might and main,
For our old friend, the railway train.

Some people will be overjoyed
When steam at last is null and void,
Especially those folk who toil
To keep us hankering after oil.

But some of those who have enjoyed
The footplate life will be annoyed
And choose this for their epitaph:
"Farewell to steam? Don't make us laugh!"

Power, like pleasure unalloyed,
Seems doomed from birth to be destroyed,
Outmatched by more mysterious might,
And hustled swiftly out of sight.

"Farewell to Steam," writes Canon Lloyd;
Let's hope the experts will avoid
(Whatever else may claim preferment)
The risk of premature interment!

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Accidents in 1956

Compared with previous years, the number of accidents on the S.A.R. during 1956 showed a satisfactory decline in numbers, and this despite a considerable increase in the number of trains operated. The actual number of accidents recorded during the first eleven month (January to November) of last year was 277 against 339 during the corresponding period of 1955.

Heavy Demand for Tarpaulins

One of the features of railway traffic in 1956 was the demand for tarpaulins for railway trucks. Strict control had to be exercised to ensure equitable distribution, but there were times when the shortage of tarpaulins embarrassed loaders of commodities needing protection against the weather. Orders were placed in the Union in November, 1956, to the value of nearly £300,000 for cotton duck for new tarpaulins.

RHODESIA

Record Tonnages

A new record in the movement of chrome, petrol, oils, and lubricants was established last December. The total tonnage of chrome moved during the month was 69,291 tons, of which approximately 58,178 tons were moved through Beira, 6,534 tons through Lourenço Marques, and 4,579 tons through the Union of South Africa.

The movement of chrome has shown an upward trend since 1951 when 313,631 tons were moved. It was 487,178 tons in 1955 and 594,262 tons a record, in 1956.

Another record established was in the movement of petrols, oils, and lubricants brought into Rhodesia. Altogether a total of 10,030,455 gal. was moved, against the previous best figure of 9,843,791 gal. in October, 1956. Of the total moved 6,442,259 gal. came through Beira and 3,588,196 through Lourenço Marques.

FRENCH EQUATORIAL AFRICA

Aerial Survey for Railway Development

Some 650 sq. miles in French Equatorial Africa are to be mapped at 1 : 15,000 with 10-metre contours in connection with railway development.

VICTORIA

Reflectorised Crossing Signs

Cross-arm and triangle signs at railway crossings are to be reflectorised. This is being done in accordance with the amended road signs code drawn up by the Standards Association of Australia.

New Basis For Track Prizes

The Railways Commissioners have approved of prizes for best-kept track lengths being awarded on the basis of a fixed amount to each man, regardless of the number in the gang.

INDIA

New N.E.R. Headquarter Building

A new building to accommodate the headquarters offices of the North Eastern Railway is to be constructed at Gorakhpur. It will be a three-storeyed structure, and will be partly air-conditioned.

The headquarters officers at Gorakhpur are at present scattered in different buildings, resulting in considerable inconvenience and loss of efficiency. The construction of the new building takes into account the expansion of staff during the period of the second Five-Year Plan.

UNITED STATES

Railside Industrial Sites

The building of arterial roads too closely paralleling railway lines has created a problem concerning the adequacy of future industrial sites, one with which communities seeking new industry are concerned as well as the U.S.A. railways. Comment on the importance of preserving potential industrial areas has been made by the management of one of the principal lines.

The problem, it is pointed out, has been brought about in large part by the location of roads too closely paralleling the railways. This problem gains even greater prominence at present with the adoption of a national road programme by the Federal Government.

Diversion of East African Railways Main Line

The first passenger train, hauled by "60" class 4-8-2 + 2-8-4 Beyer-Garratt locomotive, at Changamwe Station, on the new alignment of the E.A.R. & H. main line; the diversion was necessary to provide new marshalling yards to serve Mombasa

Early in 1956 Congress passed a Federal Aid Highway Act increasing the mileage of the national system of interstate highways to 41,000 miles. The location of these new highways, if in too close proximity to railway lines, will destroy areas which now have industrial development possibilities. State officials who have to locate, design, construct, and maintain the Federal Aid highways, subject to the approval of the Federal Bureau of Public Roads, should, it is urged, plan the location of new roads at a sufficient distance away from a railroad line so as to allow for an industrial strip 500-2,000 ft. wide between an arterial road and a railway for future development of industries. It is considered important that chambers of commerce, civic leaders, and others should recognise the danger to the future of their communities if adequate space for industry is not allowed for in civic and highway planning. On the other hand, if this vital community asset is preserved and protected it means new job opportunities for local employment and new sources of taxes for the future.

CANADA

Diesels Through St. Clair Tunnel

The Canadian National Railways are planning to convert to diesel traction, the Sarnia-Port Huron tunnel through which C.N.R. trains pass under the St. Clair river on the Toronto-Chicago main line. Tests have been carried out to determine the amount of air pollution involved.

Monorail for British Columbia

The Minister of Lands & Forests for British Columbia, Mr. R. G. Williston, announced on February 12 that the Government had entered into an "agreement of intent" with the Axel Wenner-Gren interests of Stockholm, Sweden, last November, in respect of a project which would include the construction of a high-speed monorail of the Alweg type. The monorail line would span the gap between the Government-owned Pacific Great Eastern Railway from Prince George to the Peace River area and the northern boundary of British Columbia. Contracts have been signed for surveys covering the line of the railway and also mineral and forest resources. Surveys are to start at once and work on railway construction should start by April, 1960.

The Alweg system of monorail transport was mentioned editorially in our issue of January 18.

WESTERN GERMANY

Marshalling Yard Experiments

The German Federal Railway is experimenting in the marshalling yard at Gremberg, near Cologne, with a new method of braking wagons. The wagons are allowed to run from the hump at some speed, thus clearing the hump and the main points quickly, and are slowed in the sorting sidings themselves by a chain of light rail-brakes operated by relays. The system is designed for use in yards laid out on a slight falling gradient to a centre "valley." The principle is that if the wagon is moving at more than the permissible impact speed the rail-brakes are applied. If it is moving at this speed, or more slowly, the action of the relays ensures that the brakes are not applied. The light rail-brakes are believed to be comparatively cheap to install, as against the cost of conventional retarders, and a series of them on each siding should control the wagons effectively. The experiments have not yet reached a stage at which definite conclusions can be drawn.

DENMARK

Electronic Reservation Machine

An electronic device now being installed by the State Railways in the Central Station at Copenhagen, with telewriter communication with 25 offices in different parts of the country, deals automatically with requests for reservations of train accommodation of various kinds and of space for motorcars on the several ferryboats. It is claimed to be the first of its kind in the world, and was designed by the technical staff of the Danish State Railways under the direction of Mr. Kai Hansen.

Publications Received

Un Siècle de Chemin de fer et d'Art. Paris: Galerie Charpentier, 76, Faubourg St. Honoré. 10½ in. × 8¼ in. 76 pp. Paper covers. Fully illustrated in colour and monochrome. No price stated.—This well produced survey of 100 years of railway paintings in oil and water-colour, drawings, prints, and records is well printed and produced. Some of the pictures are familiar but there are others which will be new to most. There are informative, and often engaging, commentaries by well-known writers interleaved with the principal pictures. There are prefaces by M. Louis Armand, President, and M. Charles Boyaux, Director-General, French National Railways.

Farewell to Steam.—By Roger Lloyd. London: George Allen & Unwin Limited, Ruskin House, 40, Museum Street, W.C.1. 9 in. × 5½ in. 128 pp. Price 12s. 6d.—This is not a book entirely about locomotives, but rather a series of essays on railways and railway travel in general, in the style familiar to readers of the author's previous works, and is chiefly concerned with what has made railway study and observation personally memorable to him. He applauds the great share the steam engine has had in kindling the interest with which railways have always been regarded in this country, but stresses that in private conversation nearly all senior railway officers "who know all the facts, who have all the technical knowledge, and who must carry the weight of responsibility which the amateur escapes," much as they dislike the thought of the disappearance of the steam locomotive, "have no doubts at all that it is necessary. Railways must live, and all living things must change. If it is with sadness that they have doomed the steam engine, it is also with conviction and resolution." The tradition which the steam engine has created must be renewed and strengthened by the changes, and it is to be hoped that this reasonable valedictory will play its small part in the continuance of that tradition.

Roller Bearings.—The gradual development of the roller bearing for the axleboxes of railway motive power and rolling stock is the theme of an 82-page spiral-bound book entitled "Roller Bearing Axleboxes for Railway Rolling Stock," published by Kugelfischer Georg Schäfer & Co., of Schweinfurt, Germany. This subject is treated in a most informative and objective way in 36 pages of text, and both self-aligning and cylindrical types are examined in detail. The remaining 40-odd pages are devoted to tables of dimensions and capacities of all FAG roller bearings suited to axleboxes, and to illustrated particulars of a large number of specific applications of FAG boxes to steam, diesel and electric locomotives, electric multiple-unit trains, diesel railcars, battery railcars, passenger coaches and freight wagons, up to axle loads of 31 tons. The book can be obtained from the builder at Schweinfurt, or from the associates or agents in various countries. English and German editions are available.

Train at Timken.—The British Timken-Fischer Bearings Organisation of Duston, Northampton, manufacturers of tapered roller, ball and parallel roller bearings have published a booklet which gives details of the opportunities within the Group for new recruits. The booklet will be distributed to educational and personnel bodies. Details are given of the opportunities open in the organisation's six factories. There is a general survey of the organisation's training schemes for craft, student, technical, graduate, and female apprentices, with a section devoted to notes on subsequent careers and opportunities.

UMHK-BCK Forminière.—This souvenir booklet is issued by l'Union Minière du Haut-Katanga (U.M.H.K.), the Compagnie du Chemin de Fer du Bas-Congo au Katanga (B.C.K.) and the Société Internationale Forestière et Minière du Congo (Forminière) to celebrate their 50 years of existence. It contains the text of speeches delivered at the jubilee celebrations and photographs and descriptions of the festivities,

Freight Locomotives for China

Standard gauge 2-10-2 type engines for heavy freight traffic

THE Chinese Ministry of Production has collaborated with the Ministry of Railways in designing and building the first of a series of 2-10-2 type locomotives for use throughout China, where the standard gauge is 4 ft. 8½ in. They are being built in Dairen at the former main shops of the South Manchurian Railway, which have now been transferred to the Ministry of Production as a locomotive and wagon building works.

The engines are required for heavy freight traffic and are of advanced design with the following dimensions:—

Cylinders (two), dia. and stroke	25·6 in. × 31·4 in.
Maximum axleload	20 metric tons
Diameter of coupled wheels	4 ft. 11 in.
Diameter of leading wheels	3 ft. 0¼ in.
Diameter of trailing wheels	3 ft. 8 in.
Diameter of tender wheels	3 ft. 3⅜ in.
Boiler pressure	213·3 lb./sq. in.
Heating surface:—	
Firebox and archtubes	270 sq. ft.
Flues	1,670 sq. ft.
Tubes	890 sq. ft.
Total evaporative area	2,830 sq. ft.
Area of superheating surface	1,549 sq. ft.
Grate area	73·2 sq. ft.
Weight in working order, engine	133 metric tons
Weight in working order, engine & tender	217 metric tons
Adhesive weight	100 metric tons
Tender coal capacity	15 metric tons
Tender water capacity	7,700 Imp. gal.
Tractive force at 85 per cent boiler pressure	63,000 lb.
Maximum h.p. developed	2,780

The locomotive frames are of the bar type and are of cast steel, machined all over, and were supplied by the Shanghai Steel Foundry. The cylinders are also of cast steel 25·6 in. dia. and 31·4 in. stroke, integral with half-wheel centres are of modified Box-pok type, cast in China, all tyres being shrunk on to wheel centres with an inner lip only and no Mansell rings. Front and rear trucks are of cast steel, each rear truck taking its load through heart-links, which have been found effective in preventing oscillation. The big ends and coupling rods are fitted with bronze floating bushes and are mechanically lubricated through drilled axles and crankpins. All working parts are surface hardened.

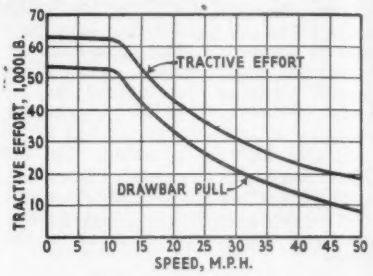
Boiler

The boiler is of large dimensions, the barrel having a maximum dia. of 6 ft. 6 in. and a length between tubeplates of 21 ft. 4 in. The grate area is 73·2 sq. ft. and is equipped with pneumatically shaken table grates and hand-operated dump grates. The ashpan is of the hopper-type without damper doors. Rivets are not used as the boiler and firebox are of all-welded construction. There are 50 flues 6 in. maximum dia., and 71 tubes of 2·24 in. dia. The flues are arranged over almost the whole tubeplate area, one tube being located between each group of four flues and the remainder round the exterior surfaces of the flues. The firebox is of steel and has no combustion chamber. Four archtubes are fitted.

The main steam pipe leaves the boiler through the front surface of the dome, and passes to the superheater header and regulator along the outside of the boiler barrel, all joints thus being easily accessible.

The smokebox is fitted with the usual baffle-plates and spark arrester. The boiler equipment includes an open-type feedwater heater, injectors, safety valves on the back ring of the barrel, blow-off cocks on the sides of the firebox shell, and a five-chamber chime whistle on the side of the dome. A fairing extends along the top of the boiler from the dome to the front of the smokebox which contains the main steam pipe and sandboxes, and also serves as a smoke-lifter.

The cab is fully vestibuled and resembles in many respects the type standard on the Canadian Pacific Railway. Enclosed cabs of this type are needed in the very low winter temperatures usual in North China. Heating and cooking facilities are supplied, together with cushioned seats for the crew. All controls are accessible to the crew without movement from seats.



Pull-speed characteristics

Westinghouse E.T.6 brake equipment is standard, with both automatic and straight-air systems for ease of train control. An air-radiator is fitted above the front buffer-beam flanked by a cross-compound air pump.

The cowcatcher is a steel casting, made in Dairen, as are the couplers and draught gears. All springs have a stiff-

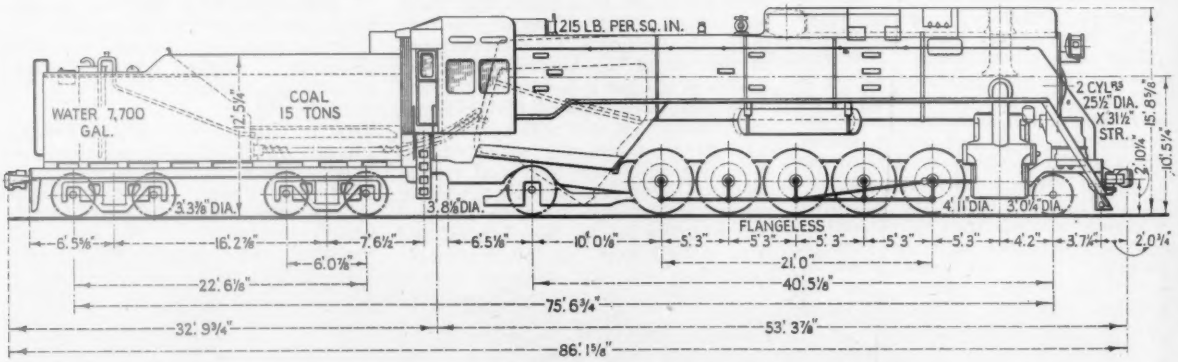


Diagram of the locomotive, showing principal weights and dimensions

saddles. The pistons and rods are unit forgings fitted with sectional piston rings and working through multi-bar type crossheads and slidebars. Walschaert valve gear is fitted, all motion bearings being of the needle type. Trofimoff valves are used having zero exhaust lap, 2 in. steam lap, and 0·315 in. lead. The maximum cut-off is 70 per cent. Power reversing gear is fitted, of the self-damping pneumatic type.

The coupled axleboxes are fitted with self-adjusting wedges, all surfaces being mechanically lubricated. The coupled

ness rating of four tons per in. The mechanical stoker is of the B.K.-1 pattern.

The tender is mounted on two four-wheeled trucks of the cast-steel arch-bar type which, with the bolsters, were cast in Dairen. The body of the tender is of the all-welded type and has a capacity of 15 tons of coal and 7,700 gal. of water. The stoker engine is mounted on the main frame and is easily accessible through a door in the side of the body. The exhaust from the stoker engine is led to the water space.

Oscillograph Recording Equipment on the Southern Region

Adoption of resistance strain gauge measuring technique

IT is a matter of general railway experience that in localities in which electric multiple-unit stock has replaced steam, track maintenance has increased as compared with that encountered with the original steam service. It has long been held that the axle-hung nose suspended traction motor is responsible for this effect, because approximately half its weight is carried directly on the axle without the interposition of springs, but there is little authoritative information, either in support or contradiction of this belief. The chief reason for this lack of information is that almost always when a line is electrified there is a very great increase of traffic, often of the order of 100 or 200 per cent, coupled with higher speeds and higher accelerating and braking rates. It is then very difficult to assess in what degree the increased wear and tear of the track is due to the different type of vehicle with electrification, to the increase in traffic, and to higher performance of the rolling stock.

In view of the large electrification extension schemes projected immediately after the war, the Southern Region of British Railways decided in 1946 that it would be wise to obtain accurate information on the subject before approving the retention of the axle-hung motors used universally on the electrified system up to that time. In order to determine the effect of an axle-hung motor on the track it is necessary to study the dynamics of the bogie containing the motors in motion on the track. This involves measurement of forces and movements occurring both within the bogie and in the track. Analysis of the results is much simplified if a continuous and simultaneous record can be obtained of a number of inter-related forces and movements.

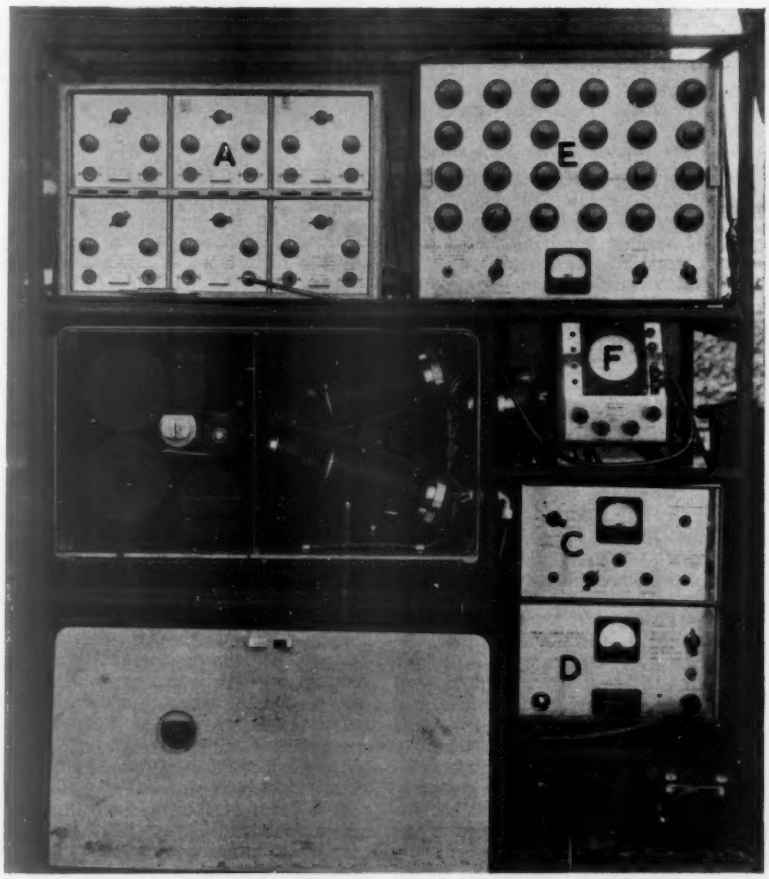
The means to be adopted for obtaining the required records were carefully studied, and it was decided to adopt the resistance strain gauge measuring technique which had been highly developed, principally by the aircraft industry, during the war. By this method strains are measured by determining the change in resistance due to elongation or compression of a grid of fine wire attached to the member under strain. Forces are measured by calculation of the stress corresponding to the strain measured. Test equipment to meet the particular requirements of the Railway was not available commercially, and had to be developed. The firm of Savage & Parsons co-operated in this work, and after extended tests supplied a six channel d.c. amplifier with cathode ray tube display and recording camera with associated apparatus. The purchase of this equipment was authorised by the then Railway Executive in 1948. It was realised from the outset that equipment of this nature could have far wider applications than the investigations of vehicle and track behaviour, and it has in fact been developed to be suitable for many other purposes.

Test Equipment

The amplifier unit is basically a six channel self-balancing push-pull amplifier which will accept symmetrical and asymmetrical inputs. Input impedance is of the order of 2 Megohms and the available voltage amplification is 40,000. Frequency response is uniform from zero to 5,000 cycle. Power consumption is 200-W. at 220-V. 50 cycle for the six amplifiers. The outputs of the six amplifier channels are fed to six cathode ray tubes having a sensitivity of 1 mm. deflection for 3-V. input. The indications on the cathode ray tubes may be recorded simultaneously on photographic paper moving at a speed of 1, 5, 15 or 50 in. per sec. as required. Timing marks are obtained by a high speed flash lamp which produces transverse time marks across the whole paper width. Calibration of the cathode ray tubes is effected by means of an oscillator which produces a stabilised 200 cycle sinusoidal voltage, and a calibrated attenuator. The output from the attenuator, which can be adjusted in ten 6-d.B. steps giving peak to peak voltages of 1-mV. to 1·024-V., is fed into the amplifiers and the indication of the cathode ray tubes for the known input signal is recorded. The calibration oscillator also provides the timing pulses at intervals of $\frac{1}{10}$ or $\frac{1}{50}$ sec.

Power to operate the equipment is provided by a supply unit of conventional design giving stabilised H.T. and a.c. heater supplies from a 24-V./234-V. rotary converter. When increased stability is required the heaters may be supplied at 6-V. d.c. Up to 24 gauges may be connected to the equipment, and selected in groups of six for recording by means of a 24-way gauge selector provided with a four-position switch.

(*Continued on page* 221)



A—d.c. amplifiers B—camera C—calibration oscillator D—power unit E—gauge selector F—monitor

Dynamic strain recording apparatus

Track Loading Fundamentals—4*

Curved track and lateral strength

By C. W. Clarke, M.I.C.E., M.I.Mech.E., M.I.E.Aust., M.Inst.T.

ON high speed track speed restrictions are generally imposed on curves sharper than 60-ch. radius, and since track stresses would be reduced in a proportionate measure permissible loading is not reduced. The ballast depth on a curve is measured as the distance below the sleeper immediately under the rail-seat on the inner rail as shown in Fig. 11. Consequently, the depth of ballast under the outer rail will be increased and the mean ballast depth will be greater, tending to reduce the pressure on the roadbed. Since ballast depth is a minimum under the inner rail the tendency is for the track to make cant under traffic where ballast depth is shallow, but on well ballasted curves with higher permissible speeds the opposite tendency may be noticed and cant may be lost under traffic. To maintain correct super-elevation on the constant radius portion of a curve and cant run-out on the transitions, curves generally require more attention than tangent track.

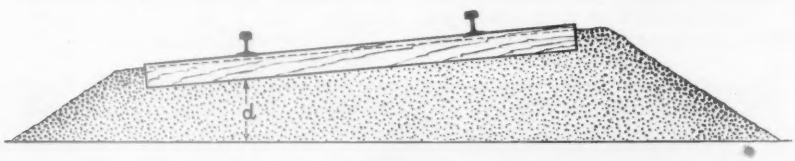


Fig. 11—Measurement of ballast depth on curved track

In British and American practice the datum level is determined from the inner rail on a curve and the super-elevation is added to the outer rail. On the continent of Europe the datum line on a curve is the imaginary line running along the centre of the track and datum levels are determined from the centre of the cross levels on the heads of the rails. Gauge is measured as the distance between the inner edges of the running rails, approximately $\frac{5}{8}$ in. below the top of the rail, and gauge widening on sharp curves is provided to enable a vehicle to track freely, but it should not be in excess of requirements or flange forces and tractive resistance of the vehicle will tend to increase. Track stresses on curves, especially rail stresses resulting from lateral forces produced by a locomotive can be high, and the flange forces produced by a locomtive on a curve are normally greater than on tangent track. To counteract this gauge tie-rods are often fitted, and if the tangent track has the rails fastened direct to the sleepers, on sharp curves bearing plates are generally fitted to inhibit any tendency to spread the gauge. In addition lateral rigidity is increased if check rails suitably fastened to the inner rail are used. The lateral strength and stiffness generally follow the same laws as for vertical loads imposed, and vary inversely as $\sqrt[4]{S}$. The lateral strength at a joint is greater than that of the parent rail.

Flange Forces

A close-spaced group of axles produce the greatest lateral forces, and generally the last but one driving axle of the wheelbase produces the greatest flange forces, which, contrary to common opinion, acts on the inner rail of the curve. The flange forces for each wheel on a curve of given radius can be computed as shown by Porter[1], or if necessary the flange forces are measured by the use of suitable strain-gauges and the permissible speed for the curve determined. The force required to move a sleeper laterally depends on the vertical load on the sleeper, and the coefficient of friction between the sleeper and the ballast, which is about 0·7 for wooden sleepers. The effect of shoulder ballast in providing lateral resistance is generally over-rated, though it helps to locate an unloaded sleeper. If a free sleeper is buried to a depth of, say, 4 in. in ballast having 6-in. ballast shoulders at each end, and carries no vertical load, a thrust of less than 300 lb. on the end of the sleeper will push it through the ballast shoulder, but if the sleeper carries a load of 8 tons it will require an end thrust of at least 5½ tons to move it. Under static loading conditions there would be little need for ballast shoulders, but under traffic vibrations occur and flicker at the ends of sleepers. Shoulder ballast is provided, which, although outside the pressure distribution pyramid under a sleeper, prevents slippage in that portion of the ballast section carrying the load. Similarly, ballast between the sleepers outside the pressure distribution pyramid is provided for the same purpose. Although providing ballast to within 1 in. of top of sleepers carries no vertical loads imposed, it does help to prevent movement of sleepers in the direction of travel.

The only justification for providing ballast above the level of the top of wooden sleepers is to blanket the sleepers to reduce the fire hazard from hot cinders dropped from the ashpans of steam locomotives. If protection from the blazing sun in some climates is needed to prevent splitting or decay, this is achieved more economically by treating the surface with creosote or some suitable preparation. The most effective use is made of ballast when it is laid below sleepers and there is seldom justification for carrying ballast any higher than within 1 in. from the top of sleepers. In fact, where track circuits are used, carrying ballast any higher can be a definite disadvantage.

Resistance to Lateral Movement

Experiments show that provided the lateral forces exerted by a locomotive do not exceed a certain critical value, lateral deflections are elastic, but if they exceed the critical value lateral movement on wooden sleepers can develop and increase suddenly, although the resistance to lateral movement for steel trough or cast-iron plate sleepers is generally greater than the flange forces which could be produced by a locomotive. The critical value might be higher than the vertical axleload, but when sleeper spacing exceeds 30 in., the critical load for a wooden sleeper may be as low as 40 per cent of the axleload. The experiments conducted by Blondel[2] established that under certain conditions lateral forces a little more than 40 per cent of the vertical load could displace track laterally, and he suggested the rule that the flange forces produced by a locomotive should not exceed 40 per cent of the vertical load plus 2 ton. This rule can be taken as a guide only, since it is dependent on sleeper spacing and other factors.

Experiments[3] show that although track laid on wooden sleepers may be slewed by a flange force equal to 50 per cent of the vertical load, derailment as a result of the wheel flange mounting the rail seldom occurs until the flange force normally exceeds about 150 per cent of the vertical load. The lower face of metal sleepers mould into the ballast and resist lateral movement, but they have a tendency to lift track if the lateral pressure is excessive. The experiments indicated that the critical ratio of lateral force to axleload, below which lateral deflections are elastic, but above which lateral movement increases suddenly, decreases as axleloads increase, and the ratio also decreases slightly with speed. The conclusion is that speed of a vehicle on a curve has negligible effect on lateral stability of the track and in fact speed plays a slightly stabilising part.

The lateral strength is reduced temporarily after resurfacing and it requires time for the track to consolidate before lateral strength is restored. Shovel packing reduces lateral resistance up to

* Parts 1, 2, and 3 appeared in our issues, January 11, January 25, and February 8, respectively

about 33 per cent and Matisa packing about 25 per cent, and it takes several days for the track to consolidate after any disturbance of the ballast.

Causes of Track Slewing

Due to the wave-like action produced by a rolling wheel, the track tends to lift some distance ahead. As a result the sleepers become unloaded and there is no frictional force to resist lateral movement. A heavily loaded leading wheel can produce an appreciable bow-wave and if there should be any jerking of the vehicle around the curve the track can be slewed under certain conditions. Sleepers also become unloaded if the wheel spacing of a vehicle is excessive. A train also can displace track laterally due to the wave in its wake, which can result in the derailment of a following train. This was advanced as a probable cause of the derailment of the Delhi-Calcutta express which occurred near Bhita[4] on the East Indian Railway in July, 1937, with tragic loss of life.

The lateral strength of track depends chiefly on sleeper spacing, the quality and depth of ballast, and the quality of the roadbed. Under vibration gravel ballast can be treacherous on sharp curves. The rail section has little effect on ultimate lateral strength, other than to maintain alignment of track on the wave-like portion when sleepers become unloaded. The tendency for track to slew on a sharp curve can be restrained by using a heavier rail to maintain alignment by increasing lateral stiffness, by laying stone ballast, by reducing sleeper spacing, or using a proportion of metal sleepers on curves. If wooden sleepers are used it helps to run an old rail, angle iron, or flat bar down the centre of the curve and spike it to each sleeper, so that unloaded sleepers are held in relative position by neighbouring sleepers.

Furthermore, if an old rail is used, since it is not directly subjected to any wave-like action of a moving wheel, its weight bears on the sleepers and provides an additional force to hold them in place and prevent lateral movement. On any track where ballast depth exceeds about 8 in., the economy of using a cheaper material as a sub-ballast, instead of using the more expensive material for the full ballast section merits consideration. For example, 8-in. metal ballast laid on 4-in. gravel ballast is cheaper and just as effective as 12-in. metal ballast. The depth of the metal ballast should be adequate for machine fettling without danger of the prongs disturbing the sub-ballast section.

Bibliography

[1] "The Mechanics of a Locomotive on Curved Track." S. R. M. Porter, published by *The Railway Gazette*, 1935.

[3] *Revue Générale des Chemins de Fer*. M. Blondel, December 1932, September 1945, October 1945.

[5] "Elasticity and Lateral Strength of the Permanent Way." R. Sonneville and A. Bentot, I.R.C.A. *Bulletin*, March 1955.

[4] *Gazette of India*, April 1938.

(To be continued)

Oscillograph Recording Equipment on the Southern Region

(*Concluded from page* 219)

A separate bridge balance circuit is provided for each gauge, giving coarse and fine adjustment. Gauge resistances within the range of 100-10,000 ohms. may be used. A calibration switch enables a known unbalance of 1 ohm. or 10 ohms. to be inserted in series with the gauges.

Survey of Tests

Since its delivery to the Southern Region the equipment has been used on a variety of projects and has not been restricted to the particular investigations for which it was originally conceived. Briefly the recording equipment is used for the measurement of the rail bending stresses set up in bull head and flat bottom rails due to the passage of vehicles, the object being to compare bending stresses set up with multiple-unit electric stock with nose suspended motors; multiple-unit electric stock with resiliently suspended motors; mixed-traffic electric locomotives of the Co-Co type; main line diesel-electric locomotives; and steam locomotives. In the light of the results of these tests a form of traction motor suspension has been developed for multiple unit electric stock which gives a degree of resilient support of the motor without the complexity of a fully resilient motor and drive. The arrangement makes use of lightweight motors and resilient gear wheels, the resilient support of the motors being achieved by interposing annular rubber rings between a roller bearing suspension tube which surrounds the axle and the motor frame. A bogie including two motors with this form of drive has been built and is undergoing service trials. The effect on the track of this arrangement is being investigated by the measurement of accelerations imposed on axleboxes, bogie frames and traction motors due to the passage of a vehicle along the track, with associated simultaneous recordings of displacements at various points on the bogie. The object of the tests, which are in their early stages, is to investigate the riding qualities of different arrangements of bogie. Quartz accelerometers are used for the acceleration measurements.

Tests involving the measurement of stresses set up in an L.T.E. bogie frame were carried out at the request of the London Transport Executive and gave useful information regarding stresses under static and dynamic conditions which will be of considerable value when designing new bogies. The tests indicated that all bogie stresses at gauged positions were well within the design factor of safety.

The equipment has also been used for development tests on electrical equipment for multiple unit trains. These include contactor testing under the high fault current condition now obtainable on the Southern Region due to the introduction of improved power supplies with the frequency conversion scheme in the London Area; traction motor tests to establish the effect of gap running and power supply interruption on the stability of the machine in weak field with either field tap or field shunt; and observation of the behaviour of equipment protection devices under fault condition and power supply interruption. These tests led to many improvements being made to contactors and control equipment already in service and on order. It was established, for instance, that control protection devices acceptable for use with field tapped traction motors were not necessarily suitable for use with field shunts.

The test equipment has already proved its worth in a number of investigations which without it would have been much more lengthy, or could not have been carried out effectively. These investigations have in certain cases led to significant improvements in design.

CONFERENCES ON PLANNING FOR INDUSTRY.—Three separate conferences on management principles and practice are to be organised this Spring by the British Institute of Management, each designed to bring to an important industrial area of Britain a cross-section of the best national resources of knowledge and experience. The programmes will be built around themes relating to management's responsibility for planning ahead and for speedy implementation of policy. The dates are: March 22-24, Northern Management Conference, Southport; April 5-7, Midlands Management Conference, Droitwich; and May 3-5, Scottish Management Conference, Gleneagles. The Northern Management Conference will be opened by Mr. F. J. Erroll, Parliamentary Secretary to the Board of Trade; the theme of the conference is "Speeding Management Decision." The Midlands Management Conference has been planned by the British Institute of Management in conjunction with the Institution of Production Engineers; its theme is "Meeting Tomorrow's Problems." The Scottish Conference will take as its general theme "Top Management Planning and Control." The Northern and Midlands Conferences have been planned with the support of the regional organisations of the Federation of British Industries and the National Union of Manufacturers and are being organised by the British Institute of Management in collaboration with local branches of the Institute of Industrial Administration. The Scottish Conference has been arranged in conjunction with local management associations. Further particulars of the conferences may be obtained from the British Institute of Management, 8, Hill Street, London, W.1.

Conveyance of Powders

Success of specially built wagons on German Federal Railway

THE experiment of conveying cement and other powdered goods by rail in pressurised vehicles started some years ago when the German Federal Railway converted 110 eight-wheel tank wagons acquired from the U.S. Army in 1948, proved satisfactory. The wagons were described in our issue of August 6, 1954.

An additional 24 eight-wheel four-container vehicles have been built and put into service. These are designated KKds 55; the containers each have a capacity of 12·3 tons (12·5 *tonnes*), and are used for the transport of argillaceous earth. For conveying cement, 262 four-wheel two-container wagons have been obtained, types Kds 54 and Kds 56.

Leading particulars of these vehicles are as follow:—

—	Kds 54	Kds 56	KKds 55
Wheelbase ..	16 ft. 4⅞ in.	16 ft. 4⅞ in.	30 ft. 8⅛ in.
Length over headstocks ..	28 ft. 0½ in.	28 ft. 0½ in.	46 ft. 2⅜ in.
Tare weight ..	10·8 tons	10·8 tons	23·1 tons
Capacity ..	22·6 tons	26·5 tons	37·4—44·2 tons
Working pressure	35·7 p.s.i.	35·7 p.s.i.	35·7 p.s.i.
Volume ..	32·7 cu. yd.	45·7 cu. yd.	4 × 18·3 cu. yd. = 73·2 cu. yd.
Axleload ..	19·7 tons	19·7 tons	19·7 tons

Compressed air is used for filling and discharging these wagons. The stock is fitted throughout with roller-bearing axleboxes with laminated springs, and underframes of welded construction. The Knorr type KEp12 passenger air brake equipment is fitted and some cars have additional screw hand brakes.

According to the nature of the goods conveyed the Kds containers hold 12·3, 13·4, or 17·2 tons each. On top of each container is a screw-clamped manhole to which a side ladder gives access. At the bottom of each container an air-pressure discharge installation is fitted, incorporating a perforated plate. A 3·94 in. (100-mm.) dia. discharge pipe begins inside the container above the shake-up bottom and leads laterally through a rubber membrane valve to a 5½-in. dia. outlet in the wagon end.

KKds wagon, showing mounting of pressurised containers on the vehicle frame

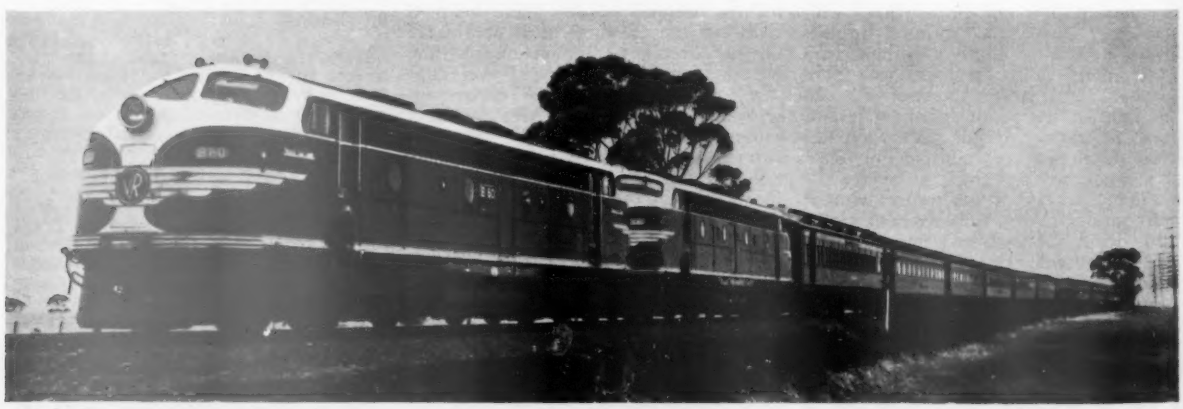
Discharge Arrangement

On the side of each wagon, there is an air pressure connection with a locking plug. The air passes through a drying unit to the discharge installation. A manometer and safety valve complete the equipment on the wagons.

The unloading procedure requires compressed air to be admitted to the container. The discharge tube is first closed, the air passes through the perforated plate and shakes up the material. The closed discharge pipe is opened as soon as a pressure of 2 to 2½ atmospheres (29·4 to 36·7 p.s.i.) in the container is reached. During the emptying process, the supply of compressed air must be maintained. The container is known to be empty when the pressure has dropped to nearly 1 atmosphere, while the air supply is still being applied.

The rate of air consumption for a 3·94 in. (100 mm.) discharge tube is 212 cu. ft. min.

Diesel Working of Australian Interstate Express



The "Overland," which runs between Melbourne and Adelaide, hauled by Clyde 1,600-*h.p. diesel-electric locomotives over the Victorian Railways main line*

Re-equipment of Pakistan Railways

Increasing production from Moghalpura workshops

Exterior of composite second, inter., and third class coach designed and built in the Moghalpura Workshops, North Western Railway

THE last war placed a considerable strain on the resources of the broad-gauge North Western Railway, in common with other railways in India, and this, with the events after Partition, left the railway badly in need of rehabilitation. There was a considerable delay in the replacement of rolling stock, which normally, would have been condemned and replaced.

In addition, large quantities of permanent way materials were required, as well as the recoupment of imported consumable stores, normally held by the railway, which for obvious reasons could not be supplied during the war, much of which had to be obtained by indigenous production, already taxed by the demands of the fighting forces.

In view of this, it was of vital necessity, if the railway were to be able to meet additional demands placed on it by the considerable increase of passenger and freight traffic, that every effort must be made to increase production from the Moghalpura Workshops which were equipped for carrying out only normal repairs to the railway's rolling stock.

Conversion of Locomotives

In January, 1948, the railway was faced with a serious shortage of coal, hitherto obtained from India, and this together with the devaluation of the rupee, trade between India and Pakistan ceased entirely. To meet what had become an acute situation, nearly 600 locomotives were converted to burn oil fuel.

The equipment was manufactured in the Moghalpura works, and were also supplied to Western Pakistan. Foreign exchange was being spent on the importation of coal, furnace, and diesel oil, so that fuel expenditure became the chief factor in formulating future policy. Between 1951 and 1956, the railway placed in service 88 diesel-electric locomotives of various types, these included Alco, International General Electric, General Motors type locomotives built by the Clyde Engineering Co. Pty. Ltd., New South Wales, and Alsthom locomotives. To carry out the servicing and repairs to these locomotives a diesel workshop with the most modern equipment was built at Karachi.

Increase in Traffic

There has been a steady increase in traffic on the railway, which reached the record figure of Rs. 360 million during 1954-1955. To cater for the increase in passenger traffic the railway has placed in service some 130 all-steel lightweight carriages of modern design, these include air-conditioned stock; the air-conditioning units were supplied by J. Stone & Co. (Deptford) Ltd. A further order for 141 all-steel coaches has been placed in Germany; these coaches are being imported in three batches, representing different stages of construction to give the N.W.R. workmen at Moghalpura experience in the manufacture of such stock.

To conserve foreign currency the railway has already embarked on a considerable programme for the supply of both carriages and wagons, all of which are being built at the Moghalpura shops, although it is necessary for the railway to import a certain amount of materials which cannot be supplied from indigenous sources, such as wheels and axles, and mild-steel sections. Much work has been carried out during the past five years towards the rehabilitation of rolling stock, which includes the manufacture of five "CWD" class locomotive boilers, providing new locomotive frames for eight "XC" class locomotives, and the building of 15 "XC" class engine tenders.

On the carriage and wagon side the railway has rebuilt 172 wagons and 310 four-wheel and 58 bogie carriages, and constructed 58 four-wheel and 56 bogie carriages, and four narrow-gauge

Inter. class compartment, showing arrangement of berths

Third class carriage for Karachi suburban services

bogie coaches, and also rebuilt 169 wagons with timber bodies, these being replaced by all-welded steel bodies. In addition 54 unit, and 50 twin-type oil tanks have been built for the Eastern Bengal Railway, East Pakistan. Wagons in course of construction at present include 94 cattle wagons, and 161 all-steel wagons to designs prepared by the Chief Mechanical Engineer. Arrangements are in hand to step up the production of all-steel wagons, which is expected to reach a total of 550 wagons annually with effect from the year 1957-58.

Bogie Passenger Stock

Arrangements have been made to build 162 bogies carriages of various types, of which 50 have already been completed and handed over to traffic. Also completed are seven bogie carriages, which will form a complete rake for Karachi suburban services, while a further 18 carriages for the same services are under construction, carriages on the Karachi suburban services are finished in a distinctive colour consisting of an aluminium paint exterior, with green lining, and lettering. Carriages are of modern design and construction, 70 ft. long by 10 ft. 8 in. width over body, and are of the vestibule type.

Much of the older stock were designed with longitudinal seats, this type of seating will be discontinued, and all future rolling stock will be provided with cross seating in both third and inter-class carriages. With the exception of upper class stock Masonite will be used extensively for interior panelling, while Formica will be used for the interior of upper class stock. Ceiling panels in all cases will be of aluminium sheeting, while stainless steel sheets will be used for exterior panels. Basic colour schemes are white enamel ceilings, and side walls will be in two shades of green. It is expected that a saving in foreign currency amounting to Rs. 1·75 crores annually will be obtained, when the carriage and wagon output from Moghalpura reaches the yearly target figures of 60 and 550 carriages and wagons respectively.

Permanent Way Materials

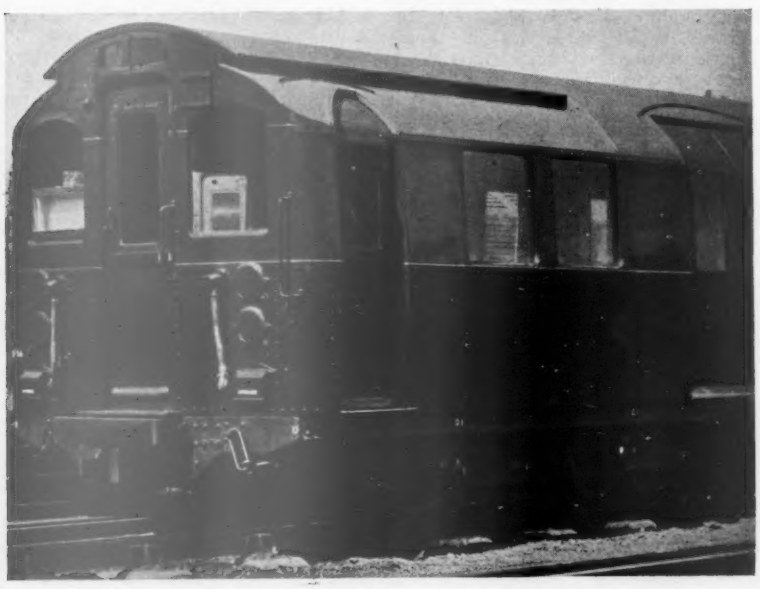
Permanent way materials to the value of Rs. 81·06 lakhs have been manufactured in the Moghalpura Works during the current year, and in this respect the railway has reach the stage of self-sufficiency. In addition to the above, the railway has commenced the mass production of reinforced concrete sleepers. Production included among others, of keys, spikes, cotters, fish-plates, points and crossings, and cast-iron sleepers. Appreciable savings in foreign currency has also been realised by the increasing production of locomotive, carriage and wagon components, many of which were previously imported. Stores to the value of Rs. 1·04 crores were manufactured during 1946-1947, this has been increased to Rs. 1·53 crores during the current year.

London Transport Rail Grinding Cars

Bogies of obsolete stock fitted with replaceable aluminium oxide blocks

UNDER the 1949 rolling stock programme, 91 new tube cars were purchased and 50 old cars sent for scrapping. Among the latter were two 1923 class Central Line cars; these have not been scrapped, however, but have been given a new lease of life by being extensively altered for use as rail grinding cars. These will replace two earlier obsolescent cars which had been similarly converted some 25 years ago, and are now due for replacement. A considerable amount of work has been necessary on both car bodies and bogies.

The seating has been removed and six water tanks accommodated on the seat risers, and associated pipework installed. Side doors have been sealed and the driver's cab bulkhead removed. The original lighting fittings have been replaced by two new circuits of five lamps each; the original heaters have, however, been retained. Brake gear, bolsters, and auxiliary side springs have been removed to permit modification of the bogies to take the grinding shoe assemblies and operating cylinders.



Bogie, showing position of the grinding shoes

Grinding is accomplished by replaceable rectangular aluminum oxide grinding blocks mounted in shoes on the bogies and applied to the running rails by pneumatic operated cylinders. On release of air from these cylinders, the blocks return to the raised position under spring pressure. The six grinding shoes are located at three positions on each side of the bogie, one at each end and one close to the centre bearing mounting. Those at the extremities each contain two blocks and the centre one four blocks.

Water spray nozzles at each outer grinding position lubricate the rails in front of the grinding blocks. The water supply is from the six tanks which have a total capacity of 1,800 gal., these can be filled externally, from either side, by large-dia. filler pipes.

Controls

Control of both air and water supplies is by manually-operated cocks inside the car. One controls the raising and lowering of all grinding blocks. Two three-way cocks are also fitted; these are used to select the appropriate sprays on each bogie according to the direction of travel.

When operating, the two rail grinding cars are coupled together between two motor cars, to form a four-car train. On reaching the section of track to be ground, the water sprays are turned on, the blocks lowered and the train worked to and fro until the corrugations are removed. During grinding, the speed is kept as near to 30 m.p.h. as possible as this has proved the most efficient speed.

RAILWAY NEWS SECTION

PERSONAL

Mr. F. J. McIntosh, Chief Engineer of Rhodesia Railways, retired on January 9.

Mr. Robert Gerson da Costa, who, as recorded in our January 25 issue, has relinquished the appointment of Railway Adviser to the High Commissioner for India, was born on January 11, 1908. He was educated in St. Joseph College, Bangalore, and later read for his degree in mechanical engineering in the Mysore University College of Engineering. Mr. da Costa joined the G.I.P. Railway (now the Central Railway) on April 7, 1931, in the Research Department, and was made officer in charge of the dynamometer car in 1934. He was transferred to the locomotive workshop at Parel in December, 1937, and was Works Manager for some time in 1945 before his transfer to the Central Standards Offices for Railways as a Research Officer in November, 1945. In this capacity he made contributions to the design of the W.P. locomotive, the first of the Indian postwar standards. In 1949 he was deputed to the United Kingdom and the U.S.A. and was attached to Messrs. Rendel, Palmer & Tritton for special work on the design and inspection of rolling-stock. In May, 1950, he was posted as Deputy Chief Controller of Standardisation (Mechanical Designs) and was responsible for the specifications and designs of nine new classes of standard locomotives, over 2,000 of which have since been built. In March, 1951, his headquarters were moved to Chittaranjan with the locomotive wing of the Central Standards Offices. He was entrusted with the re-organisation of that section and with the inspection of locomotive production at Chittaranjan and at the Tata Engineering & Locomotive Works. From June 1, 1953, Mr. da Costa was posted as Railway Adviser to the High Commissioner for India in London. He will be relieved on February 26 by Mr. L. T. Madnani, when he will return to the Central Standards Offices in New Delhi. Mr. da Costa has contributed several papers to the Institution of Locomotive Engineers.

Mr. R. G. da Costa
Railway Adviser to High Commissioner for India, 1953-57

Mr. L. T. Madnani
Appointed Railway Adviser to the High Commissioner for India

We regret to record the death on February 16, at the age of 63, of Lord Hore-Belisha, Minister of Transport from 1934 to 1937.

Mr. F. W. Burton, Director of Audit, British Transport Commission Headquarters, has been appointed Regional Accountant, Southern Region, British Railways, with effect from February 11, 1957.

Mr. R. L. Hughes, General Agent for the Canadian Pacific Railway in Manchester, who retired on January 31 after 44 years of service, joined the C.P.R.'s subsidiary Express company at Manchester in 1913. He was transferred to London in 1921 but returned to the Manchester office in 1931 as agent for the Canadian Pacific Express Company. In 1938 he took charge of the Manchester office on his appointment as General Agent for the parent company, the position from which he now retires.

Mr. L. T. Madnani, M.I.Loco.E., A.M.I.Mech.E., who, as recorded in our January 25 issue, has been appointed Railway Adviser to the High Commissioner of India, was born on May 15, 1909, and received general education in Delhi and Lahore. He joined the Indian Railways as a special class apprentice in 1928, and after four years' training at Jamalpur Locomotive Works, came to Britain and became a pupil for two years with the L.M.S.R. at Crewe. On his return to India in 1935, Mr. Madnani was appointed an Assistant Works Manager at Jamalpur Locomotive Works. During the next six years he worked there in various capacities and was then transferred to the Divisions. In 1942 he was promoted as Divisional Mechanical Engineer. He returned to Jamalpur as Works Manager in 1946, and in 1948, was selected and posted as a Senior Mechanical Engineer in the newly-formed organisation to set up a locomotive building works in India. He was associated with these works, being directly in charge of the lay-out, erection of plant and machinery, and setting-up of production for the next six and a half years. In 1949 he again visited Britain in company with the General Manager of the Chittaranjan Locomotive Works to check on the progress of machinery and plant ordered in this country and to form a liaison with the British loco-

motive manufacturers. At the end of 1953 he visited Japan to tour the works of locomotive building firms there. In January, 1955, when the Chittaranjan Locomotive Works had achieved the original target output of 10 locomotives per month, Mr. Madnani was posted to the Railway Board, Ministry of Railway, New Delhi, as Joint Director, Mechanical Engineering. In June, 1956, he took over as Director, Mechanical Engineering, the position he now relinquishes to take up his new appointment in this country as Railway Adviser to the High Commissioner for India.

Chairman of the Italian Executive Committee of the Fifteenth International Railway Congress which took place in Rome.

Dr. Eng. Severo Rissone, who, as recorded in our January 11 issue, has been appointed Director-General of the Italian State Railways, was born in Turin on October 22, 1897, and graduated Engineer from the University of Turin. During the 1914-18 war he attained the rank of Lieutenant in the Photo-Electric Service, and, after a period with Soc. F.I.A.T., he began his railway career in May, 1921, when he joined the Italian State Railways

Mr. W. R. Wright, Director of Public Relations, Canadian National Railways, Montreal, is in this country on a tour of the C.N.R.'s public relations organisation in Europe. Mr. Wright will return by air to Montreal on February 25.

Mr. K. Rowell has been appointed a director of W. H. Allen Sons & Co. Ltd.

Mr. P. Spilsbury, who, as recorded in our February 8 issue, has been appointed General Agent for the Canadian Pacific Railway in Manchester, joined the C.P.R. in London in

Mr. Giovanni di Raimondo
Director-General, Italian State Railways, 1944-57

Dr. Eng. Severo Rissone
Appointed Director-General of the Italian State Railways

Mr. Giovanni di Raimondo, Director-General of the Italian State Railways, who, as recorded in our January 11 issue, has retired, was born in 1892 and graduated in civil engineering at the Turin Polytechnic. In 1940 he was appointed Senior Controller of Military Transport in Italy, including movement by land, sea, and air. After the armistice in 1943 he became Transport Delegate of the Italian Government at Allied Forces Headquarters with the duty of establishing contact and maintaining co-operation in the reorganisation of the transport system and of initiating reconstruction of the railways in Italy in the rear of the combatant troops. In November of the same year he was appointed Director-General, Italian State Railways, and, a few days later, became Under-Secretary of State for Communications, acting as Minister. He occupied this position until shortly before his reappointment in July, 1944, as Director-General of the Italian State Railways by the first Italian Government to be constituted since the liberation. In 1950 Mr. Raimondo was at Genoa. Service at Milan and Florence followed, during which he was engaged on problems connected with the development of electric traction throughout the system. In 1944 he became Chief of Florence Department, where considerable reconstruction was necessary. This work was accomplished, with the help of the department's staff, in record time. He was appointed Chief of Naples Department in 1952, a position in which he gained the respect and regard of railway personnel through his ability to establish good staff relations. He was nominated Director-General on November 24 last year.

The following members of the department of the Chief Civil Engineer, North Eastern Region, British Railways, have been elected Associate Members of the Institution of Civil Engineers: Mr. J. A. Lewis, Assistant District Engineer, York; Mr. J. B. Hollingsworth, M.A., Assistant District Engineer, Darlington; Mr. C. T. Webster, Resident Assistant, Park Lane, Gateshead

1928. He made seven round-the-world cruises in the company's "Empress" liners before the war and was Cruise Director on a number of Mediterranean voyages. Throughout the war he served in the Royal Engineers, mostly in the Middle East, after returning from operations in Norway in 1940. He attained the rank of lieutenant-colonel and was awarded the M.B.E. Mr. Spilsbury returned to the London City office of the C.P.R. in 1947. In 1950 he was transferred to Bristol on appointment as Freight & Passenger Agent there, and was promoted General Agent in 1952, the position he now vacates.

In connection with the opening of the new combined Bar and Rod Mill at Samuel Fox & Co. Ltd., the following appointments have been announced: Mr. P. Thompson as Manager of the Bar and Rod Mill, Mr. A. E. Hanselman as Assistant Manager (Rolling), Mr. L. Long as Assistant Manager (Warehouse & Treatment). Consequent on the above, Mr. A. Crossley will act in a technical capacity for bar treatment matters and will

Mr. D. S. Hart

Appointed District Passenger Manager, Birmingham, L.M. and Western Regions

be responsible for bringing the section into production. He becomes Manager, Steel Treatment Department. Mr. C. Brooks becomes Assistant Manager of No. 1 Melting Shop.

Mr. C. W. Edwards has been appointed British Railways General Agent for Belgium & Luxemburg, at Brussels.

Mr. D. S. Hart, O.B.E., E.R.D., who, as recorded in our February 8 issue, has been appointed District Passenger Manager, London Midland and Western Regions, British Railways, as from January 28, began his career with the Great Western Railway as a booking clerk in 1923. In 1929 he transferred to the office of the Worcester Divisional Superintendent, and, in 1938, joined the staff of the Divisional Superintendent at Paddington. As an officer in the Royal Engineers (Supplementary Reserve), Mr. Hart was called up at the outbreak of war. He served in France and, subsequently, as a staff officer in the Middle East, where he was responsible for transportation, intelligence, and planning. A similar appointment at G.H.Q. India followed before he became Assistant Director of Transportation in Persia. In 1943 he joined the Planning Staff for the Invasion of Normandy and, on demobilisation, was Colonel in charge of the Hamburg Division, German Railways. On his return to England, Mr. Hart underwent a course of special training, and, in 1947, became Junior Assistant to the Divisional Superintendent at Birmingham. Before appointment as Assistant to the District Operating Superintendent, Bristol, in 1950, he carried out acting duties as Chief Clerk in Birmingham and Assistant District Traffic Manager at Oswestry. In 1952 he returned to Oswestry as District Traffic Manager, and, after carrying out temporary duties at Cardiff the following year, was made Chairman of the Working Committee which formulated the steam internal service for the Birmingham district early in 1954. During 1955-56 Mr. Hart studied railway working in the Netherlands, following which he was appointed Assistant District Operating Superintendent at Birmingham (Snow Hill), Western Region, the position he now vacates. Mr. Hart was mentioned in despatches for his services in Persia and was awarded the O.B.E. for his work throughout the European campaign.

We regret to record the death on February 10, at the age of 68, of Mr. J. L. Meadowcroft, Hotels Superintendent (North East), Hotels & Catering Services, British Transport Commission. Mr. Meadowcroft, who had over 50 years of service, began his railway career in the Hotels Department at Liverpool Street, of the Great Eastern Railway in March, 1903, after "ground-floor" training in the industry. In 1912 he was appointed Assistant to the Manager of the Parkeston Quay Hotel, Essex. During the 1914-18 war he served in the Middlesex Regiment and later in the Railway Operating Corps. On demobilisation in 1919 he became Assistant Banqueting Manager at Abercorn Rooms, Liverpool Street Hotel, and, a year later, was transferred to the Marine Department as Assistant Shore Purser. He remained at Harwich as Manager of the Parkeston Quay Hotel for 10 years until his appointment in 1934 as District Hotels Manager, Grimsby. In 1936 Mr. Meadowcroft moved to Sheffield as Manager of the Royal Victoria Hotel; in 1938 he was appointed Restaurant Cars Superintendent at Kings Cross (Great Northern Section), and he became Assistant Hotels Superintendent of the L.N.E.R. (Southern Area) in 1942. He moved north to York in 1945 to become Hotels Superintendent of the North Eastern Area, L.N.E.R., and, on nationalisation, was designated N.E. Region Hotels Superintendent. In 1949, when the Hotels Executive was formed, he was appointed Area Superintendent, Eastern Area, Hotels Executive. Mr. Meadowcroft was a member of the Catering Wages Board and a member of the Council of the British Hotels & Restaurants Association. For several years he was the hotels and catering representative on the Yorkshire Council for Further Education. He retired from the position of Area Superintendent, Eastern Region, Hotels & Catering Services, at the end of 1953, but was recalled in January, 1955, on the retirement of his successor, to assist in the supervision of the hotels in the North Eastern Area. His designation at the time of his death was Hotels Superintendent (North East), Hotels & Catering Services.

The funeral, which was held on February 15 at Acomb, York, was attended by the following:—

Messrs. H. A. Short, General Manager, North Eastern Region, British Railways (also representing Mr. T. H. Summerson, Chairman, North Eastern Area Board); A. R. Dunbar, Assistant General Manager, North Eastern Region, British Railways (also representing Mr. C. P. Hopkins, General Manager, Southern Region, British Railways); A. P. Hunter, Chief Operating Superintendent, North Eastern Region; L. Sproat, Assistant Operating Superintendent (also representing Mr. E. J. Vipond, Operating Officer, British Transport Commission); F. Grundy, Chief Commercial Manager, North Eastern Region; H. F. Sanderson, Assistant Commercial Manager (also representing Mr. E. W. Arkle, Chief Commercial Manager, London Midland Region); F. H. Petty, Motive Power Superintendent, North Eastern Region; B. H. Clegg, Chief Solicitor, York; W. O. Gay, Chief of B.T.C. Police, Northern Area; F. A. Pledger, Assistant Chief of B.T.C. Police, Northern Area; A. F. Wigram, Signal Engineer, North Eastern Region; S. F. Major, Estate & Rating Surveyor, North Eastern Region; C. L. Smith, Assistant Estate & Rating Surveyor, North Eastern Region; S. W. Jesper, Public Relations & Publicity Officer, North Eastern Region; C. L. Cuthbert, Assistant Regional Welfare Officer, North Eastern Region (also representing Mr. C. Cooper, Regional Establishment & Staff Officer, North Eastern Region).

The late Mr. J. L. Meadowcroft

Hotels Superintendent (North East), Hotels & Catering Services, B.T.C., 1955-57

Hotels & Catering Services

Messrs. H. J. B. Kelley, Officer for Personnel (also representing Chief Officers at Headquarters, St. Pancras Chambers); E. J. Vacher, Chief Hotels Manager (also representing Mr. F. G. Hole, General Manager, British Transport Hotels & Catering Services); S. Sweeney and J. D. Curran, British Transport Hotels & Catering Services.

Many members of the York area staff of the Hotels & Catering Services were also present.

Mr. H. G. N. Read has resigned from the board of the Trent Motor Traction Co. Ltd. following his retirement from active business.

Mr. H. S. Tanner has been appointed Stationmaster at Brighton, Southern Region, British Railways.

The British Transport Commission announces the following Headquarters appointments:—

Mr. J. E. B. Jefferson, Audit Assistant, Finance Department, to be Senior Assistant, Finance Department.

Mr. C. A. Pass, Assistant to Motive Power Superintendent (Mechanical), Euston, London Midland Region, British Railways, to be Assistant (Motive Power), British Railways Central Staff.

Mr. N. K. Misra, Deputy General Manager, Sudan Railways, has also been appointed Special Duty Officer, Minister of Communications' Office, Khartoum.

Mr. C. Hallett, has been elected General Secretary of the Amalgamated Engineering Union by the very close margin of 242 votes. He defeated Mr. John M. Boyd, the Scottish member of the A.E.U. Executive.

Mr. E. S. Little has been re-appointed a director of the British Thomson-Houston Co. Ltd. on relinquishing his offices of Comptroller and Secretary. He will be succeeded as Comptroller by Mr. A. D. Gregory and as Secretary by Mr. A. E. Wilson.

NEW EQUIPMENT AND PROCESSES

Compact Overloader

THE Muir-Hill Cardinal ¾ cu. yd. capacity hydraulic overloader is of application, for example, to loading high-sided open wagons, as shown in the illustration, and other stock piling and clearing uses. The Cardinal, designed for a one-ton lifting capacty, is available with driver's weather protection of a type which is convertible into a cab by the addition of side windows and a rear door.

The machine has a driver-controlled roll-back bucket action at the loading position, with an automatic crowding and levelling action which first levels the bucket and then maintains it in a level position up to its maximum lift. Maximum tipping height is 9 ft. 5 in. to bucket lip (with 17 in. forward reach and 50 deg. tipping angle). The maximum forward reach, with beams horizontal, is 4 ft. 5 in.

The Cardinal is powered by a 4-cylinder, Fordson Major diesel engine, developing 44 b.h.p. at 1,750 r.p.m. The gearbox, of the constant mesh type, which provides six forward and two reverse speeds, is driven through an 11-in. single dry plate clutch. Welded frames are of unorthodox design to give a good strength to weight ratio, and are mounted directly onto the tractor to form a rigid unit. A solid steel beam steering axle centre pivoted with radius rod control provides articulation. Lifting beams of dumbell section are fabricated, and carry roll-back type bucket linkages with rubber shock absorbing bushes in the reset linkage. In the hydraulic system, a heavy-duty gear pump supplies single acting main rams and double acting reset rams, being controlled by twin hand levers placed on the driver's right for independent or combined operation with one hand.

Drum type 10 in. × 1¾ in. dia. brakes are fitted to the loader and a multi-disc transmission hand operated brake is provided for parking. The driver's seat is fully adjustable, as are the pedals.

The standard bucket is of ¾ cu. yd. capacity; 1 and 1½ cu. yd. buckets are also available. Buckets are the full width of the steering tyres ensuring clean working. Dimensions of the loader are, overall length 14 ft. 3½ in; maximum width 6 ft. 2 in.; overall height 7 ft. 5 in. (5 ft. 11 in. without cab or weather protection). The turning radius is 17 ft. Steering tyres are 7·50 × 16 × 8-ply; driving tyres are 10 × 28 × 6-ply standard, or alternatively 12·00 × 24 × 8-ply.

The price and delivery details of the Cardinal are available on application to the manufacturer, E. Boydell & Co. Ltd., Old Trafford, Manchester, 16.

Stove for "On-Site" Cooking

BUILT to withstand rough handling and constant use, the Model CS.56 cooking stove which has been used by U.S.A. railway civil and signal engineers for site locations, is now available in this country.

Of simple design, the stove, the maker claims, will operate for 4½ hr. on 1½ pints of paraffin, and so it needs refilling less often than a normal cooker. An interesting feature is the automatic built-in internal pricker wire which does away with the difficulty of using a loose pricker wire.

The heat output of the stove is such that two pints of water can be boiled in approximately 4½ min. The container is of brass, which is highly polished and protected by clear laquer. The trivet is of steel finished in black vitreous enamel, while the burner dome is of stainless steel. The cooker is operated as is usual with the manufacturer's products.

Dimensions of the C.S.56 are: height 11¼ in.; cooking ring 7½ in. dia. and container 7 in. dia. It weighs 6 lb. complete with oil, the oil capacity being 1½ pt.

Delivery can be made from stock. The price is available on application to the manufacturer, the Tilley Lamp Co. Ltd., 70-72, Jermyn Street, Piccadilly, S.W.1.

Public Announcer System

THE Repetina announcer system can record any instruction or direction, such as crowd control repetitive instructions to passengers at stations, of up to 15 sec. duration. The message can then be repeated, in several languages if desired, over any number of loudspeakers.

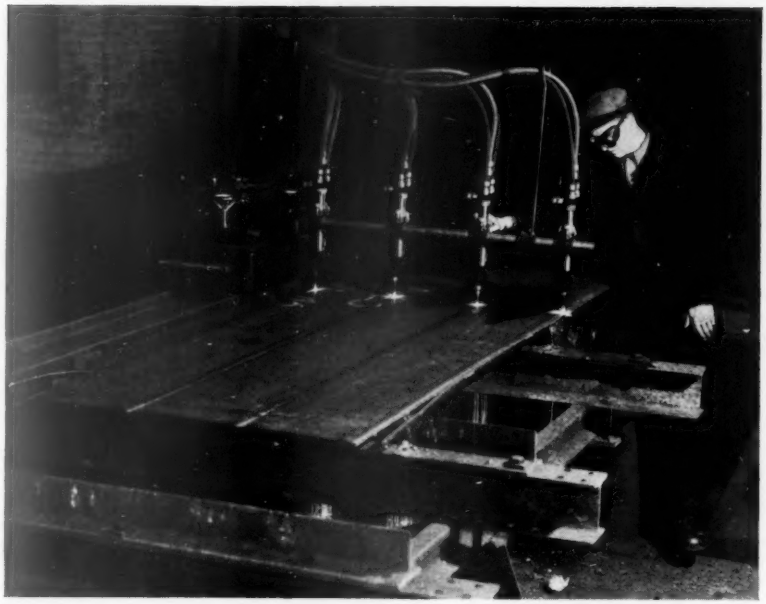
This system can be set to operate either once or continuously at predetermined intervals. If a series of messages are required to be given a bank of repeater units may be installed. New messages can be re-recorded, automatically erasing the old one. Being compact and easy to install the Repetina can be made mobile by installation in a vehicle, which makes the system versatile.

The system consists of four basic items; the repeater unit shown in the illustration, the record and erase unit, the auto-control unit and the loudspeaker which is normally supplied less cabinet and cables.

The system operates from a mains voltage range of 110/230 V. Although normally supplied for 50 cycles operation, arrangements may be made to suit a 60 cycles supply. The power consumption is standby 25 W., operating 58 W., and recording 62 W.; the maximum output power is 3 W.

The Repetina can be triggered off by a variety of means which include manual operation, and train-actuated automatic mechanism.

The basic price of the Repetina system is £85 10s. and delivery is 2-3 weeks from the receipt of order. The manufacturer is Southern Instruments Limited, Frimley Road, Camberley, Surrey.



Protective Lifting Sling

THE Talurit Safety Sling, a further development of the makers' mechanical wire rope splice, is stated to provide perfect safety on other items in lifting awkward loads such as diesel engines, being made to suit the weight of the item lifted.

The sling consists essentially of specially made rubber sleeves each fitted onto two cables. These rows are combined in an interlocking patterned arrangement. A typical example of a Safety Sling can be seen in the illustration below, and also shows the patented Talurit shackle, connecting the cables together. The flexibility of the slings ensures a perfect grip on an irregularly-contoured load; this is useful for handling high quality or fragile products.

The method of construction allows for easy and economical repair as the individual rubber pads can be replaced when necessary, making the life of the sling practically endless.

Apart from the standard material, the rubber sleeves can be supplied of acid-resistant or sea-water-resistant rubber. The slings which are designed and manufactured to a factor of safety of 8 to 1 can be supplied in any width, length and lifting capacity, fitted with or without the patented Talurit shackle. A proof loading certificate is issued with each sling.

The manufacturer is Cable Covers Limited, Talurit Division, St. Stephen's House, Westminster, S.W.1.

Steel Strip Cutting Machine

THE difficulty of obtaining ready-cut steel strips of certain sizes in this country is being solved in some works by cutting steel plate themselves. The equipment normally used for this purpose is a large piece of machinery, which absorbs valuable floor space. A piece of equipment now available is stated to be cheaper, portable, not to require to be permanently positioned, and to be easily transportable. The strip cutting machine can be designed to suit specific applications which include the cutting of platework for rolling stock underframes.

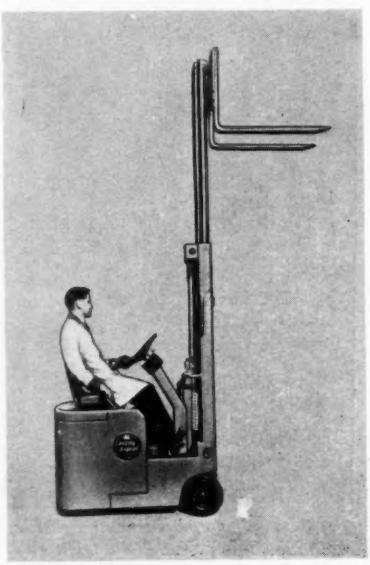
The machine is fitted to the manufacturer's heavyweight tractor. A bar is mounted on the tractor and on the bar is fixed four Portable Straight Line cutting blowpipes. On the machine illustrated the bar is 3 ft. long but this may be extended to suit specific situations. The minimum cutting width between the cutters is 2¾ in. The machine runs on a 10-in. track.

Typical cutting speeds for the machines are : 75-80 ft. per hr. for ¼-in. thick plate; 60-65 ft. per hr. for 1-in. thick plate. A larger strip cutting machine on which, in its standard form, can be mounted up to 12 cutters over a width of 10 ft. has also been designed.

The manufacturer, British Oxygen Gases Limited, S.W.1, offers to design similar machines to suit individual applications, using their standard equipment where possible.

Electric Fork-Lift Truck

SUITABLE for use with palletised traffic at stations and depots, including the loading of wagons from the track side, the model FOER 3 rider-controlled electric fork truck is stated to possess outstanding manœuvrability. With a turning radius of 49½ in., the FOER 3 will stack 40-in. × 40-in. pallets at 90 deg. from a 103-in.



wide gangway. Capacity of the standard FOER 3 is 2,300 lb. at 20-in. centres, though a 3,000-lb. model will be available to order. The length with standard 36-in. forks is 95½ in. The service weight is 5,300 lb.

The truck is of strong construction, the chassis and frame being fabricated from ¼-in. to 2-in. steel plate; the twin telescopic mast is of thick section bright drawn steel, the inner mast running on hardened steel rollers against the outer. The 4-in. × 1⅝-in. solid-forged alloy steel forks slide on substantial guideways on the welded steel fork carriage.

The three solid rubber tyred wheels are 12 in. dia., the single rear wheel being controlled by a car type steering-wheel fitted for one-hand operation. Rear wheel drive is from a variable-speed shunt-wound motor, the speed being infinitely variable up to 5 m.p.h.

The hydraulic brake acts on the two load (front) wheels; a hand parking brake acts on the same brake shoes. Regenerative braking is incorporated to limit the speed of the truck on descents as well as returning power to the batteries at normal speeds. Rheostatic braking is also standard, used at lower speeds to control the truck almost to a standstill. With these two systems in operation, the hydraulic brake is rarely needed.

A maximum lift of 10 ft. can be obtained, with 58 in. free lift, 10 deg. tilt backward and 2 deg. forward. Lifting and tilting are hydraulically operated, flow valves controlling the speeds. Batteries of the FOER 3 can be recharged overnight, if desired, from a normal mains supply without special equipment, the current being automatically switched off when the batteries are fully charged.

Price and delivery details are available on application to the manufacturer, Lansing-Bagnall Limited, Basingstoke, Hants.

Load Tests on G.E.C. Traction Rectifiers

One of the 2,200/2,500-kW., 660/750-V. rectifier equipments supplied by the General Electric Co. Ltd. in connection with the change-of-frequency scheme in the Southern Region, British Railways, has undergone an on-site test at Brockley substation.

G.E.C. rectifier equipment at Brockley substation, Southern Region

The test lasted 12¼ hr., during which the average load was 115·5 per cent of full load, the maximum load being 197 per cent full load for a period of 5 min., while 150 per cent full load was maintained for 3 hr. 10 min.

During the test the performance of the equipment fully substantiated the results obtained previously in a works test at Witton, when two rectifiers were subjected to a series of peak loads reaching 6,750 A. at 4-min. intervals for 2 hr., followed by a 3-hr. run at full load.

Institution of Railway Signal Engineers

At a well-attended meeting of the Institution of Railway Signal Engineers held in London on January 16, when the Chair was taken by the President, Mr. J. C. Kubale, a paper was read by Mr. D. M. Clarke on "Communications as Applied to Railways." The paper described the types of telephone exchange equipment used by the railways and methods of dealing with calls, including the queueing system developed for the handling of calls made by the public to railway enquiry offices; omnibus circuits—the link giving country stations and signalboxes intercommunication with one another; trunk circuits, the main through link of communication, interconnecting all the important telephone exchanges; special purpose circuits, which are provided for train control by telephone, signalling, level crossing protection; conference circuits; telegraphs; overhead lines; cabling; and the use of radio-telephony. Referring to future developments, Mr. Clarke said that it would appear that there would be a considerable extension of automatic working, both telephone and teleprinter, although a measure of manual control would seem desirable. With increased use of automatic switching, it might be possible to dispense with the duplication of circuits and some special circuits. The high price of raw materials, such as lead and copper, made attractive the employment of equipment to cut down their use.

Carrier Telephony

Mr. R. P. Quelch, opening the discussion, referred to the great expansion which had taken place between the years 1932 and 1956. It had been his good fortune to be associated with some of the early experiments connected with carrier telephony, when it soon became obvious that the whole of the trunk working was going to be revolutionised. The quality of transmission far transcended anything heard over the ordinary telephone over a distance of about 100 miles, and now one was approaching 12-channel working. He felt that, with the discovery of the uses to which might be put the remarkable properties possessed by germanium crystals, there opened up another great field.

Mr. D. R. Turner said that the paper implied the interesting and important factor of the dependence of present facilities on a gradual historical development. New facilities were provided, from time to time, as the need arose, within strict financial limitations. Consequently, the telecommunication systems could not be planned as a whole. If those systems were destroyed overnight and had to be replaced, would Mr. Clarke reproduce the existing scheme? If the answer was no, what differences would he suggest? The question was intended to relate more to principles than to the number of circuits.

"O" Level Working

Mr. C. A. Browne stated that the question of "O" level working, as compared with separate calling lamps, was a subject that was receiving serious consideration at the present time. With regard to telephone circuit concentrators in signalboxes, they were very useful where there was a boy in the box to answer the telephone, but with a signalman working on his own, on turning round after finishing a signalling operation, he would not know which circuit had called, unless a pilot lamp could be kept alight.

Mr. J. F. H. Tyler thought that there had been a tendency sometimes in the past to add on new telephones to existing circuits, whereas it would be better to consider more often the introduction of new circuits. He wondered whether full advantage was being taken of some of the facilities provided. For instance, time could be saved on occasions by using the teleprinter instead of writing a letter.

Mr. G. H. Townsend mentioned the London Midland Region experiment with a facsimile machine for the transmission of commercial documents for the Commercial Manager's Department, which had met with considerable success.

Mr. J. Runnett referred to transposed circuits, as used in America, and the revolving twist system, and enquired what results had been found on British Railways. He also asked whether, at stations where an automatic exchange existed, any provision was made on the operating side for separate telephone communication.

After Mr. Clarke had replied to the points raised, Mr. Kubale moved a cordial vote of thanks to him for his very valuable paper.

Station Improvements at Southend

Work is well in hand on the Eastern Region £24,000 modernisation scheme for Southend-on-Sea Central station, which, with six platforms, is the biggest of nine stations serving Southend. A considerable parcels traffic is handled which, last year, amounted to more than 180,000 consignments. In the same period, the station dealt with several million business travellers and holiday visitors.

The work now being done will bring the station up to modern standards and will provide improved facilities for users of the London, Tilbury & Southend line services. It includes a glass-fronted ticket office with a small messroom for ticket and parcels office staff. The new ticket office will be erected on a different site from the existing ticket office, so avoiding disruption of booking facilities during the construction stage. The bookstall is being re-sited and the altered booking hall will have a new floor.

The up parcels and left-luggage office will be re-arranged and modernised to include a new cycle store. While this work is in progress, temporary parcels and left luggage accommodation will be provided in the area now used for public access at the west end of the station buildings.

Waiting rooms are being re-designed, with new furniture, floor coverings, and heating. Public lavatories are being

modernised with new fittings and asphalt flooring. The refreshment room is being redesigned, extended, and will be completely modernised with a new counter and new furniture. To avoid inconvenience to passengers, this work will be carried out in two stages, a full buffet service being maintained.

Staff Rooms

A staff room is to be provided for porters and shunters and the existing staff rooms for inspectors, ticket collectors, and guards will be modernised. A new concrete barrier is to be erected at the head of platforms Nos. 4, 5, and 6, with new ticket collector's boxes. Electric lighting is being installed throughout the station premises and much of this has already been completed. The general arrangement is cold cathode fittings on the platforms and in the booking hall, refreshment rooms, and waiting room, with fluorescent lighting elsewhere.

The scheme is scheduled for completion before commencement of the holiday season, this year. The modernised station buildings were designed by Mr. H. H. Powell, Architect, Eastern Region, under the general direction of Mr. A. K. Terris, Chief Civil Engineer. The main contractor for the work is Hosking & Son (Essex) Limited.

Parliamentary Notes

Transport (Railway Finances) Bill

The Transport (Railway Finances) Bill was formally read a Third Time in the House of Lords on February 14, and now awaits Royal Assent.

Hampstead Tube Station Lifts

Mr. Glenvil Hall (Colne Valley—Lab.) in the House of Commons on January 31, on the adjournment, called attention to the "unsatisfactory nature" of the lift service at Hampstead tube station, where automatic lifts had "given constant trouble ever since they were installed."

Following an episode about a month before, he wrote to London Transport, but beyond an acknowledgment he received no reply until after he had put down his name for the adjournment debate.

The lift shaft at Hampstead tube station was the deepest in London—181 ft. deep. Nearly three years ago, new swift-moving automatic lifts were installed. Unfortunately, these lifts had continually given trouble.

He understood the failures had been as many as 12 a month. He was not blaming London Transport for this. It was quite obvious to him that the breakdowns were not due to inefficiency or bad management. He imagined the trouble to be due to the depth of the shaft and to the fact that the tunnels running south and north were rather long, causing, at times, a terrific rush of air up the shaft.

"What I do blame the Executive for," Mr. Hall continued, "is that knowing all this, it appears to take its duties so lightly that it did not trouble to have an engineer or other competent person on duty even during the rush hours. . . . This almost casual attitude was demonstrated earlier this year when one of the lifts stuck during the rush hour, with 21 passengers jammed together in a lift—7-7½ ft. square. They were there for 30 min. before they were released by the doors being forced with a crowbar." He had learned since then that the foreman ticket-collector should have switched off the air pressure to enable the doors to be opened by hand.

Mr. Airey Neave, Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation, said he believed London Transport had written to Mr. Hall apologising for the inconvenience that occurred in the incident on January 1.

The Executive was making every effort to cure the defects in the lift machinery. It was curing the faults in co-operation with the manufacturers of the lifts.

There were originally five lifts of an older pattern. Two modern, high-speed, automatic lifts were installed in April, 1954. London Transport took a great pride in this modern equipment. It had to be of rather a special character, because this was the deepest underground railway shaft in London. After all that, the reliability of these lifts had been a great disappointment to the Executive.

Dealing with the defects in the machinery he explained that the current of air blew dust up the lift shaft and the passage of the trains through the tunnels had a piston effect which pushed dust up the lift shaft into the control gear. It was a very difficult thing with which to deal and required having the control gear in dust-tight cabins.

Additional shielding was to be installed round the vulnerable parts of the machinery.

The incident on January 1 was caused by an electrical defect. The Executive thought it had now eliminated electrical defects. On January 1 the lift over-ran the top landing by a few feet, and the foreman ticket-collector tried to move the lift down by going into the control room. He should have switched off the pressure, and would then have been able to open the doors with the special tool provided. He had had special instruction in the handling of the automatic lifts, and had been on these duties since October, 1956. He was reprimanded.

There was now an electrical fitter on duty at Hampstead during the hours of operation. There were lift engineers on call at strategic stations along the line. In this case, the ticket collector did not summon them.

In the last fortnight there had been only one stoppage in 25,000 trips. There was still the dust trouble. The doorway into the tunnel had been blocked out at the bottom of the lift shaft; no doubt this would be a help.

Questions in Parliament

Railway Tourist Services

Sir Ian Fraser (Morecambe & Lonsdale —U.) asked the President of the Board of Trade on February 12 what discussions he had had with the British Travel & Holidays Association to ascertain whether passenger rail services during the coming summer would be adequate to meet the demand; and if he would make a statement.

Mr. F. J. Erroll, Parliamentary Secretary to the Board of Trade, replied that there was no need of special initiative, as the British Travel & Holidays Association was then, as always, in close touch with the British Transport Commission about train services for tourists.

Sir Ian Fraser: Train services to seaside resorts are always important, but may be even more important if there is likely to be a petrol shortage.

Mr. Erroll said it was too early to forecast what the petrol position would be in the summer, but the Minister of Power appreciated the importance of the point. He pointed out that so long as holiday travel was concentrated on certain peak dates during the summer, passenger travel facilities on the railways were bound to be severely strained.

Railway Station Taxicabs

Mr. A. Blenkinsop (Newcastle-upon-Tyne, E.—Lab.) asked the Minister of Transport & Civil Aviation on February 6 whether he would give a general direction to the B.T.C. instructing it not to use its powers under the Railways Act, 1840, to prosecute taxi drivers plying for hire in station ranks, in view of the recommendations of the Departmental Working Party on Hackney Carriages.

Mr. Harold Watkinson: This is not an appropriate matter for a general direction.

Mr. Blenkinsop stated there had been prosecutions in Newcastle which amounted to little more than special protection for a particular type of monopoly.

Miss A. M. Bacon (Leeds, S.E.—Lab.) asked whether it was not high time that the whole practice of British Railways taking fees from a few taxis at stations was abolished. In many cities, including Leeds, passengers were kept waiting for taxis in the station approach, when there were taxis outside which were not allowed to enter the precincts of the station. Would the Minister see that the whole thing was done away with?

Mr. Watkinson: Certainly it would be proper for me to give an assurance that the whole thing will be done away with. If the House wishes me to do so, I will certainly have another look at the matter. The view of the Commission, of which I must take notice, is that primarily this is done for the convenience of passengers.

Canvey Island Railway Crossing

Mr. B. Braine (Essex S.E.—C.) asked the Minister of Transport & Civil Aviation on February 13 what arrangements had been made by his Department, the Essex County Council acting as the Highway Authority, and British Railways, Eastern Region, to ensure adequate road access from Canvey Island to the mainland following the proposed electrification of the Fenchurch Street-Shoeburyness line and the expected increase in rail traffic.

Mr. Harold Watkinson: The Essex County Council and the B.T.C. are considering these matters, and I understand that the Commission hopes to reduce the time during which the level crossing gates are closed on each occasion so as to offset the effect of any increase in the frequency of trains after electrification.

Mr. Braine asked whether the Minister was aware that over and over again plans for a high-level bridge at this point had been shelved because of the difficulty of finance.

Mr. Watkinson: I understand that the difficulty about the bridge is not one of finance. It is discussions with the P.L.A. about headroom over the creek.

Station Car Parks

Mr. R. S. Russell (Wembley S.—C.) asked the Minister of Transport & Civil Aviation on February 13 if he would take steps to encourage motorists, who now left their cars in car parks at stations outside London and travelled to and from the City and West End by train, to continue to do so after petrol rationing finished.

Mr. Watkinson said he proposed, as the practice had advantages for everyone, to consult the motoring organisations and the B.T.C. to determine what further action could be taken to encourage motorists to park near railway stations and complete their journey by rail.

Contracts and Tenders

British Railways, London Midland Region, have placed contracts for the tar-spraying and road repair programme, 1957, with:—

Thomas Ashley (Contractors) Limited, Northwich, Cheshire, for Crewe district

Johnson Bros. (Aylesford) Ltd., Tonbridge, Kent, for Walsall, Northampton, Lancaster, London, and Manchester Districts

Constable Hart & Co. Ltd., Richmond, Surrey, for Derby South District.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from the International Co-operation Administration (I.C.A.) Procurement for Ceylon, for diesel-hydraulic or diesel-electric power coaches and control equipment for driving four-coach suburban train units, 5-ft. 6-in. gauge, class S3. The contract shall include for the supply of power coaches complete with power units, hydraulic or electric transmission, bogies, underframes, controls, power and hand brakes, superstructures with passenger accommodation and all components, equipment and furnishings, to make them complete in every respect and ready for service after minor assembly and finish painting in Ceylon. Each power coach shall include a set of remote control equipment for controlling train from last trailer coach. The power coaches are required to form four-coach train units as shown on Ceylon Railway drawing No. DC.302/01.

The project implementation order No. is 83-33-05-9-60022. The tender No. is 15. Bids should be sent to the Ministry of Transport & Works, Transworks House, P.O. Box 547, Colombo 1, Ceylon. The closing date is May 29, 1957. Copies of tender documents, including specifications, conditions and drawings, can be obtained, by requesting the appropriate tender number, from the Offices of the High Commissioner for Ceylon, 13, Hyde Park Gardens, London, W.2. The reference E.S.B./3417/57/I.C.A. should be quoted in any correspondence with the Branch (Lacon House, Theobalds Road, W.C.1).

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Portuguese East Africa for 40 petrol tank wagons.

Bids should be sent to the Ports, Railways and Transport Department, Lourenço Marques, Portuguese East Africa. The tender No. is 31/57. The closing date is May 16, 1957. A copy of the tender documents (in Portuguese) is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 1s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. United Kingdom firms are reminded that they cannot submit tenders direct but only through firms established in Mozambique whose names are registered with the Stores Department of the Treasury (Almoxarifado de Fazenda), Lourenco Marques. The Branch will, on request, supply the names of local concerns who have expressed their willingness to act on behalf of United Kingdom firms. The reference E.S.B. 3679/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Australia for locomotives, as follows:—

2 diesel-hydraulic shunting locomotives, with spare parts and complete set of working drawings

The issuing authority is the Victorian Railways. The tender No. is 61,107. Bids should be sent to the Secretary, Victorian Railways, Melbourne, C.1. The closing date is March 20, 1957. A copy of the tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 14s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference E.S.B. 3799/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for boiler tubes, as follows:—

32 superheater element tubes, complete, shape No. 1, for YP class engines to consulting engineer's drg. No. E/SL/216/94 mod. (D.G.S. & D. No. 13279) fig. A IRS. specn. R-23/51 & R-32/54. (Ref. No. EA1/19585-1.)

34 superheater element tubes, complete, shape No. 2, for YP class engines to consulting engineer's drg. No. E/SL/216/94 mod. (D.G.S. & D. No. 13279) fig. B IRS. specn. R-23/51 & R-32/54. (Ref. No. EA1/19585-2.)

32 superheater element tubes, complete, shape No. 3, for YP class engines, to consulting engineer's drg. No. E/SL/216/94 mod. (D.G.S. & D. No. 13279) fig. C IRS. specn. R-23/51 & R-32/54. (Ref. No. EA1/19585-3.)

35 superheater element tubes, complete, shape No. 4, for YP class engines to consulting engineer's drg. No. E/SL/216/94 mod. (D.G.S. & D. No. 13279) fig. D IRS. specn. R-23/51 & R-32/54. (Ref. No. EA1/19585-4.)

31 superheater element tubes, complete, but without cones and flanges, top row, for H, H1 & O class engines to loco. drg. No. 186/LHI alt. 1. (D.G.I. & S. No. 1021/A) fig. A & specn. R-23/51 & R-32/54. (Ref. No. EA1/19580.)

34 superheater element tubes, complete with cones and flanges, bottom row, for H1 & O class engines to loco. drg. No. 186/LHI alt. 1. (D.G.I. & S. No. 1021/A) fig. B IRS. specn. R-23/51 & R-32/54. (Ref. No. EA1/19562.)

5 superheater element tubes, complete, shape No. 3, for PAS class engines to Ex. Morvi Rly's drg. No. 58606 (D.G.S. & D. No. 13281). Fig. C IRS. specn. R-23/51 & R-32/54. (Ref. No. EA1/NS-379.)

7 superheater element tubes, complete, shape 1, for PAS class engines to Ex. Morvi Rly's drg. No. 58606 (B.G.S. & D. No. 13281) IRS. specn. No. R-23/51 & R-32/54. (Ref. No. EA1/NS-376.)

7 superheater element tubes, complete, shape No. 2, for PAS class engines to Ex. Morvi Rly's drg. No. 58606 (D.G.G. SD. No. 13281) fig. B IRS. specn. No. R-23/51 & R-32/54. (Ref. No. EA1/NS. 378.)

18 superheater element tubes, complete, bottom row for AS class engines, to drg. No. 22 (D.G.S. & D. No. 13280) A IRS. specn. No. R-23/51 & R-32/54. (Ref. No. EA1/NS.)

18 superheater element tubes, complete, top row for A.S. class engines to drg. No. 22 (D.G.S. & D. No. 13280) A IRS. specn. No. R-23/51 & R-32/54. (Ref. No. EA1/NS.)

The issuing authority is the Director General of Supplies and Disposals. The tender No. is P/SW2/18866-G/I. Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is March 5, 1957. A set of tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). The reference E.S.B. 3271/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Thailand for locomotive boiler tubes, as follows:—

Seamless steel boiler tubes for Japanese locomotive as per drg. 351 S.3-2005

120 first row
160 second row
160 third row

Seamless steel boiler tubes for McArthur locomotive as per drg. 380 S.3-2001

100 first row
140 second row
140 third row

The issuing authority is the Railways Organisation of Thailand. Bids should be sent to the Committee opening Bid No. 00022, c/o Chief of Stores Office, Railways Organisation of Thailand, Kasatsuk Bridge, Bangkok. The closing date is March 6, 1957.

A copy of the relevant tender documents and drawings is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). The reference E.S.B. 3892/57 should be quoted in any correspondence with the Branch.

The Director-General of Supplies and Disposals, New Delhi, invites tenders for the supply of axleboxes, as follows:—

2,800 axlebox front covers to I.C.Fy. drg. No. T-0-2-007 alt. e (D.G.S. & D. No. 10178/3) (approx. weight each 12 lb. rough cast)

2,800 axlebox rear covers to I.C. fy. drg. No. T-0-2-003, alt. d (D.G. S. & D. No. 10177/3) (approx. weight each 12 lb. rough cast)

Both items to be made of sand castings in light alloy Alufront-3B treated with min. ultimate tensile strength 20·3-23·5 tons/sq. in., proof stress (0.2 per cent) 14 to 16·5 tons/sq. in., elongation percentage, L= 11·3 area, 3 to 7 per cent, Brinell hardness (10/500/30) 90-100, impact value, charpy, 0·6 Mkg./Cm^2, fatigue bending stress (20×10^6 reverses) ± (5·1-5·7), alternatively to B.S. 1490/55-L.M.-11 W.P. To be supplied as cast without machining but with excess material for machining properly cleaned and free from burrs and sand with clean smooth surface. All castings to be guaranteed against defects and breakages for one year from date of taking coach into regular service.

The address to which tenders should be sent is the Director-General, Supplies &

Disposals (Section SRI), Shahjahan Road, New Delhi. The tender No. is No. P/SRI/RC-4163/1. The closing date is March 5, 1957.

Forms of tender are only available for purchase in India from, Deputy Director-General (Supplies), Directorate General of Supplies & Disposals, New Delhi; Director of Supplies & Disposals, Bombay or Calcutta; Deputy Director of Supplies & Disposals, Madras. If the date for the receipt of tender does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotation to India in their own letter form or by telegram provided always that all essential particulars are given and further provided they simultaneously apply for the tender forms and return them duly completed as soon as possible on the basis of advance quotations already submitted. A copy of the tender form can be examined at the India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3, on application to the "CDN" Branch quoting reference S.2974/56/Rly./BN, and the drawing can be seen at the office of Hodges Bennett & Company, 59/60, Petty France, Westminster, London, S.W.1, from whom copies may be obtained, if these are required, at a fixed price per sheet.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from South Africa for cast iron and cast steel spares as follows:—

5,000 brakeshoe holders
500 buffer guides
2,000 handbrake wheels
3,000 yokes
15,500 hinge knuckles
4,000 sockets
5,200 packing boxes, vacuum piston rod
800 rocking grate bars
500 rocking grate fire bars, perforated type
250 drop grates

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. H.6377: Cast Iron and Cast Steel Spares," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg.

The closing date is March 1, 1957. A copy of the tender documents, but not drawings, is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 6s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The attention of firms is drawn to the fact that because of the present import restrictions the South African Import Control will not issue an import permit if there is any possibility of obtaining the goods required locally, either from local manufacturers or from overseas manufacturers ex locally held stocks. Where invitations to tender are extended overseas the issue of an import permit will be considered but will not automatically be granted. If an overseas firm is successful, the import permit will be issued, but if a local offer is made, it can be accepted without committing the Administration to the issue of replacement permits. The reference E.S.B 3559/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for cotters for pot sleepers as follows:—

30,000 cotters, standard for pot sleepers, Ex-M. & S.M. Rly. drg. No. 6178 (D.G.T. & S. No. 2148) & I.R.S. S. T8/5-50

20,000 cotters, enlarged, for pot sleepers, Ex-M. & S.M. Rly. dr. No. 6178 (D.G.T. & S. No. 2148) & I.R.S. S. T8/5-50.

30,000 cotters, reduced, for pot sleepers, Ex-M. & S.M. Rly. dr. No. 6178 (D.G.T. & S. No. 2148) & I.R.S. S. T8/5-50

10,000 cotters, small, for pot sleepers (special "D") Ex-S.I. Rly. dr. No. ET723-32 (I.S.D. No. 14379) & I.R.S. S. T8/5-50

4,200 cotters, for CST 9 sleepers BG and MG (side split type) I.R.S. drg. No. T.432, alt. nil & I.R.S. S. T8/5-50

The issuing authority is the Director General of Supplies and Disposals. The tender No. is P/SR2/19592-G/II. Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The closing date is March 1, 1957.

A set of tender documents is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch for 12s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. Local representation is essential. The reference E.S.B./3273/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for crank signal wire and lamp brackets as follows:—

733 crank signal wires, 1 way
314 crank signal wires, 2 way
1,262 lamp brackets for semaphore spectacle
1,256 arm brackets for semaphore spectacle

Bids should be sent to the Director General of Supplies and Disposals, Shahjahan Road, New Delhi. The tender No. is SRIA/18447-G/V(C). The closing date is March 5, 1957. A set of tender documents, including drawings, is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). Local representation is essential. The reference E.S.B. 3521/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from South Africa for overhead track equipment as follows:—

4,250 steady arms in accordance with S.A.R. drawing No. ENW. EIJ. 115/1, and S.A.R. specn. No. ENW. T.55/8, July, 55

2,900 hockey sticks in accordance with S.A.R. drawing No. ENW. EIJ. 120/1, and S.A.R. specn. No. ENW. T.55/8, July, 55

The issuing authority is the Stores Department, South African Railways. Bids, in sealed envelopes, endorsed "Tender No. C.1816, Overhead Track Equipment," should be addressed to the Chief Stores Superintendent, South African Railways, P.O. Box 8617, Johannesburg. The closing date is March 13, 1957. A copy of the tender documents, including drawings and specification, is available for loan to United Kingdom firms on application to the Branch (Lacon House, Theobalds Road, W.C.1). A photo-copy set can be purchased from the Branch tor 11s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The attention of firms is drawn to the fact that because of the present import restrictions the South African Import Control will not issue an import permit if there is any possibility of obtaining the goods required locally, either from local manufacturers or from overseas manufacturers who have locally held stocks.

Where invitations to tender are extended overseas the issue of an import permit will be considered but will not automatically be granted. If an overseas firm is successful, the import permit will be issued, but if a local offer is made, it can be accepted without committing the Administration to the issue of replacement permits. The reference E.S.B. 4150/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, reports that the closing date of the call from Australia for bulk wheat wagons, reported on page 145 of our issue of February 1, has been extended to April 18, 1957. The reference ESB/2386/57 should be quoted in any correspondence on this matter with the Branch.

TRADE EXHIBITION OF VACUUM BRAKE EQUIPMENT.—The British Railways trade exhibition of vacuum brake equipment requirements at Euston Station, N.W.1, details of which were given in our issue of February 8 last, provides a visual indication of the details, and also the quantities of the different materials required. Delivery of all items is required to commence on November 1 next, to be evenly spread over the ensuing 12 months, and completed by October 31, 1958. The exhibition closes on March 1.

RHODESIA RAILWAYS TRUST MEETING.—The annual meeting of Rhodesia Railways Trust Limited was held in London on February 7. In his circulated statement, Mr. C. Hely-Hutchinson, the Chairman, stated that the gross income of the trust for the year ended September 30, 1956, was £419,712, £42,878 higher than in the previous year. The net profit of £202,441 showed an increase of £21,723, or just over 12 per cent. These results justified the board's recommendation that the final dividend be raised to 10 per cent, making a total of 14 per cent, as compared with 12½ per cent for the previous year. The balance of unappropriated profits carried forward would be increased by £40,977 to £199,616. The book value of investments quoted outside Great Britain had risen by about £261,000, with a corresponding decrease in the total of investments quoted on Stock Exchanges at home. This difference was accounted for by further investments made during the year under review in the U.S.A. and Canada. The report and accounts were adopted.

Notes and News

District (Civil) Engineer Required.—Applications are invited for the post of district (civil) engineer required by British railway company operating in Chile. See Official Notices on page 236.

Sales Representative Required. — An engineering firm in the Midlands has a vacancy on its sales staff for an experienced representative to organise and control a department dealing with the sale of a new development product. See Official Notices on page 236.

Engineering Assistant Required.—London Transport require an engineering assistant for lighting and cable section of Signal Engineer's Office, Earls Court, for work connected with programming and procedure of special and new works. See Official Notices on page 236.

Engineer Buyers & Representatives Association.—A display of films by Guest, Keen & Nettlefolds Limited, will be given at a meeting of the Engineer Buyers & Representatives Association to be held at the Overseas League, St. James's Street, S.W.1, at 7 p.m. on February 28.

British Railways Inter-Regional Boxing Competitions.—Over 200 railwaymen boxers from all parts of the country have entered for the 1957 championships of the British Railways Amateur Boxing Association. The inter-Regional semi-finals will take place at York on April 12, and the finals of the championships at the Royal Albert Hall, London, on May 9.

Iron Ore Wagons for Scotland.—The accompanying illustration shows the presentation of the plaque commemorating the completion at Shildon Works, North Eastern Region, of the first of the 270 33-ton capacity iron ore wagons specially designed by British Railways in conjunction with Colvilles Limited. It is regretted that in recording, in last week's issue, that this presentation took place, the names of Mr. H. A. Short and Mr. James Ness, General Managers respectively of the North Eastern and Scottish Regions, were omitted from the list of those present.

Institute of Transport, Annual Dinner.—The annual dinner of the Institute of Transport will be held on Friday, March 15, at the Dorchester Hotel, Park Lane, London, W.1.

G.N.R.(I.) Cookstown Branch.—The Great Northern Railway Board is reported to have stated that it was unable to reopen the line between Dungannon and Cookstown for passenger traffic as the likely patronage would not be sufficient to recoup the expenditure involved. Recently the Northern Ireland Ministry of Commerce stated that the matter was one entirely for the G.N.R. Board to decide.

Railway Bridge Destroyed in Buenos Aires.—On the night of February 12, a bomb exploded under the railway bridge crossing the river at Villa Domenico, a Buenos Aires suburb, on the main line from La Plata. A petrol pipeline running beside the railway was damaged and burst into flames, which enveloped the bridge. A train which was crossing at the time accelerated and escaped without significant damage. The heat of the fire eventually distorted the bridge, which fell into the river.

N.F.U. Transport Chairman.—At a meeting at the Hyde Park Hotel, London, on February 11, Mr. A. C. B. Pickford, Chief Commercial Manager, British Railways, Western Region, with his Assistants, said farewell to Mr. A. G. Wright in his capacity as chairman of the Transport Committee of the National Farmers' Union, and welcomed his successor, Mr. J. L. Brighton. Mr. Wright referred to the fact that he had been chairman of the N.F.U. Transport Committee for 14 years; his most satisfying achievement, he said, was the close liaison he had created between the N.F.U. and the railways. With the G.W.R. and the Western Region the relationship had been most cordial, and he paid high tribute to the co-operation always forthcoming and to the very efficient arrangements made for conveyance to markets of produce such as new potatoes from Cornwall and Pembrokeshire and broccoli from the West Country. Mr. Wright also praised the handling of the flower traffic from the Scilly Isles and the West of England and that of 250,000 tons of sugar beet from factories at Allscot and Kidderminster. Replying, Mr. Pickford expressed his agreement with all that Mr. Wright had said as to the happy relationship between the N.F.U. and the Western Region, which he felt sure would continue under Mr. Brighton.

George Cohen 600 Group Limited.—At a board meeting of the George Cohen 600 Group Limited held on February 12 it was resolved that an interim dividend of 3¼ per cent actual, less tax, be paid on the £2,500,000 ordinary stock of the company on March 31, 1957, in respect of the company's financial year ending on that date, and that the half-yearly dividend due on March 31, 1957, on the £1,500,000 4½ per cent cumulative preference stock of the company be paid at the rate of 4½ per cent per annum, less tax.

Obstructive Action of Argentine Driver.—An express carrying 230 passengers was delayed for 14½ hr. in Bariloche Station, on the General Roca Railway, on January 22, because of the action of a driver, who had arrived at the station with a train which was 1½ hr. late. Alleging that his turn was finished, he dropped the fire and left the engine on the main running line. No other member of the locomotive running staff could be persuaded to move the engine for several hours. When the original driver reported for duty, he refused to take charge, as the engine was not in the sheds but in the station. Another driver was sent for, and after an inquiry, the first man was summarily dismissed.

Retired Railway Officers' Society.—The fifty-sixth annual meeting of the Retired Railway Officers' Society took place at the Great Eastern Hotel, Liverpool Street, on February 12, when over 40 members were present to receive the report and statement of accounts for the past year. The latter showed a very satisfactory cash balance of £198. The report stated that membership of the society stood at 183; thirteen new members were elected, but 12 of the older members passed away. Among the latter were Major A. S. Mills, a former Secretary and President, and Mr. E. B. Hassall, also a Past President. The monthly meetings of the society had been well supported with an average attendance of 44. Several interesting talks were given by Members during the year, and at the May meeting Mr. J. W. Watkins, then General Manager of the London Midland Region and now a member of the British Transport Commission, gave an informative address on the British Railways modernisation programme. The annual summer outing for members and their ladies attracted a larger number than for some years past and consisted of a rail and coach trip to Hastings and the Cinque Ports in very good weather. The annual autumn luncheon was held at the May Fair Hotel, Piccadilly on Novem-

Presentation of the plaque commemorating completion at Shildon of the first of the 270 ore wagons. (Left to right) Mr. A. C. E. Poole, Sir Andrew McCance, Sir Ian Bolton, and Mr. G. H. Kitson

ber 6, 1956, with a record attendance of 176, more than half of whom were guests; an account of this function appeared in our November 9 issue. The choice of the special sub-committee appointed to nominate a President for 1957 was Mr. George Morton, formerly Chief Financial Officer of the Railway Executive. The Hon. Secretary, Mr. F. E. Cox, and Hon. Treasurer, Mr. J. H. Laundy, were re-elected, as were the Hon. Auditors, after the passing of a vote of thanks for their past services.

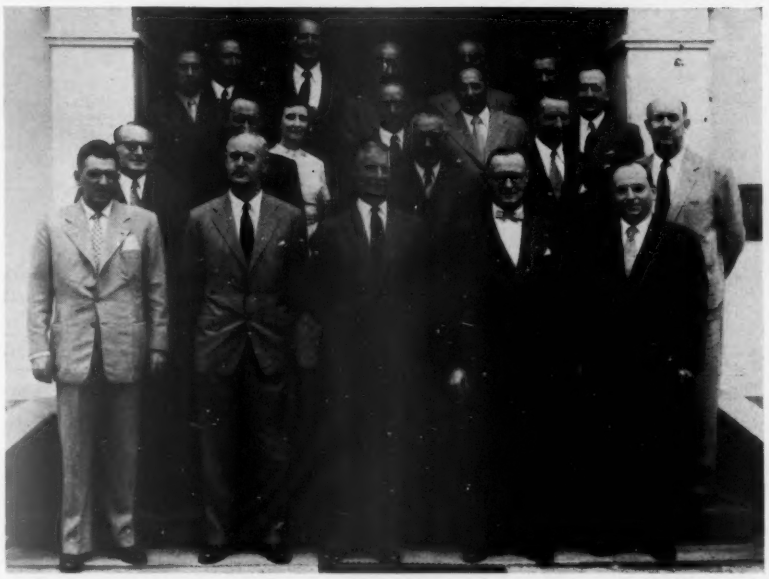
"Mistral" Extended Again to Nice.—The French National Railways "Mistral" express, which late last year was curtailed to run only between Paris and Marseilles, is now running through once more between Paris and Nice. The curtailment was a fuel economy measure, as the locomotives hauling the "Mistral" between Marseilles and Nice were normally oil-burning 2-8-2s.

Institute of Transport Visit to Spain.—The Council of the Institute of Transport announces that arrangements are in hand for a visit to Spain from May 21 to May 30, 1957, inclusive. Headquarters will be Barcelona, and hotel accommodation will be reserved in the City. The programme will be on similar lines to those arranged for the visits to the Netherlands in 1952 and to France in 1954. Those wishing to take part in the visit are asked to notify the Secretary of the Institute, Mr. F. W. Crews, immediately by postcard marked Spain, giving name, grade and address.

Explosion Damage to Bridges on G.N.R.(I.).—Two bridges on the Great Northern Railway line from Belfast to Londonderry, near Carrickmore, between Dungannon and Omagh, in Tyrone, were damaged by explosions early on February 17; one, an underline bridge, was extensively damaged, and the railway track twisted, whilst the other, over the line some distance away, remained passable to traffic. An emergency bus service was run between Carrickmore and Pomeroy Stations.

Driver of "Bristolian" at Press Club Dinner.—Among the guests at the London Press Club Speed Night Dinner on February 15 was Mr. S. J. Wilkins, an engine driver of the Bristol Motive Power Depot, British Railways, Western Region, who regularly drives the "Bristolian" express. Other guests included Lord Selsdon, Messrs. Neville Duke, Stirling Moss, and Chris Brasher, Captain D. W. Sorrell (until recently Master of the *Queen Mary*), Mr. Mike Hawthorne, and Captain George Eyston. Mr. Wilkins was accompanied by Mr. C. J. Rider, Public Relations & Publicity Officer, Western Region.

Liverpool Street—Southend Victoria Electric Service.—An interim review of the electric train services on the Liverpool Street—Southend-on-Sea Victoria line which began on December 31, 1956, has been completed in the light of experience gained in the first weeks of operation. There have been substantial increases in the number of passengers at all stations but, in general, the service has worked well and apart from certain trains at peak hours there has been no undue overcrowding. From February 11, two additional trains have been introduced in the up morning service. The present census figures are to some extent influenced by petrol rationing and the permanent pattern of travel on the line is expected to emerge when rationing ceases. In the meantime steam services are generally being well maintained on the Southend-on-Sea Central to Fenchurch Street Line and there is no evidence at present of any big switch of passengers from that line to the new electrified service. Traffic figures on both lines have increased. A further census of the traffic on the Southend-on-Sea Victoria line is being held during February.



Principals and other senior officers of the four railways concerned at the meeting at Bulawayo to discuss matters relating to through traffic via Lobito

New Range of English Electric Motors on Show.—A preview of the range of ventilated electric motors built by the English Electric Co. Ltd. to the new British standard draft specification CW (ELE) 6246 with ratings of ½ h.p. to 50 h.p., took place last week at the Goring Hotel, London, S.W.1. These motors are of the Class C range with standard dimensions and utilise Class E insulation. This has the effect of making models of the new range lighter, smaller and cheaper than the types they supersede. In the accompanying illustration, Mr. H. G. Nelson, Managing Director, is seen at the preview with Mr. C. Horne, Manager, Industrial Motors, inspecting the new motors.

Through Traffic via Lobito.—The illustration above shows principals and other senior officers of the four railway undertakings concerned who met in Bulawayo to discuss questions in relation to through traffic between Lobito and Rhodesia over the

At the preview: Mr. H. G. Nelson (right) with Mr. C. Horne

Benguela Railway, to which reference was made in our January 4 and February 1 issues (left to right): Mr. A. Pereira Leite, Director General, Mozambique Railways; Colonel R. J. Walker, Director, Benguela Railway; Lt.-Colonel H. B. Everard, General Manager, Rhodesia Railways; and Mr. L. Ghyselinck, Deputy Director General, Bas Congo-Katanga Railway.

Midland Silicones Leeds Sales Office.—The North Eastern Area Sales Office of Midland Silicones Limited has moved to more extensive premises. The Area Sales Manager is Mr. R. Nattrass. The new address is Midland Silicones Limited, 5/7, New York Road, Leeds, 2; telephone: Leeds 26768.

Trent Motor Traction Co. Ltd. New Vehicles.—Delivery is now being completed of an order by the Trent Motor Traction Co. Ltd. for 34 new double-deck vehicles. These are of the latest design; the chassis is the well-known Leyland PD.2 type with 9.8-litre diesel engine. The bodies were built by Metropolitan-Cammell Carriage & Wagon Co. Ltd., of Marston Green, Birmingham, and are of all-metal construction. Five of these vehicles were received recently. Twenty-eight have already been placed in service and a further six will be introduced on March 1.

Forthcoming Meetings

Open currently and until further notice.—British Transport Commission: Historical Exhibition "Transport Treasures" in Shareholders' Meeting Room, Euston Station, from 10 a.m. to 6 p.m. on weekdays, and 2 to 6 p.m. on Sundays. Admission 6d.

February 26 (*Tue.*).—Institution of Mechanical Engineers, at 1, Birdcage Walk, Westminster, S.W.1, at 6.45 p.m. Steam group discussion: "Conversion from coal to oil firing."

February 26 (*Tues.*).—Railway Correspondence & Travel Society, East Midlands Branch, at the N.C.S. Guild Room, Toll Street, Nottingham, at 7.15 p.m. Paper on "More G.W.R. reminiscences," by Mr. P. J. Garland.

February 27 (*Wed.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. Paper on "Some aspects of locomotive boiler feedwater treatment," by Mr. A. J. Parsons jointly with Mr. J. S. Hancock.

February 28 (*Thu.*).—Railway Correspondence & Travel Society, Leeds & West Riding Branch, at the British Railways Social & Recreation Club, Aire Street, Leeds, at 7.30 p.m. Paper on "More about transport relics," by Mr. J. H. Scholes.

March 1 (*Fri.*).—The Railway Club, at 57, Fetter Lane, London, E.C.4, at 7 p.m. Annual Presidential Address, "E. S. France and the 'Potteries' Railways," by Mr. Kenneth Brown.

March 2 (*Sat.*).—Stephenson Locomotive Society, Sheffield Centre, at the Y.M.C.A., Yargate, at 6.30 p.m. Paper on "The Cromford & High Peak Railway," by Mr. Raymond Marten.

March 5 (*Tue.*).—Permanent Way Institution, Leeds & Bradford Section, in the British Railways Social & Recreation Club, Ellis Court, Leeds City North Station, at 7 p.m. Paper on "The Manchester, Wath & Sheffield Electrification Scheme," illustrated by lantern slides, by Mr. F. W. Sly.

March 5 (*Tue.*).—South Wales & Monmouthshire Railways & Docks Lecture & Debating Society, at the Angel Hotel, Westgate Street, Cardiff, at 6.30 p.m. "Some historical notes on the Docks in South Wales," illustrated by lantern slides, by Mr. R. H. Edwards.

March 8 (*Fri.*).—Railway Correspondence & Travel Society, Scottish Branch, at 25, Charlotte Square, Edinburgh, at 7.30 p.m. Paper on "The N.E. Region of British Railways," by Mr. R. A. Savill.

March 8 (*Fri.*).—Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, Eversholt Street, London, N.W.1., at 7.25 p.m. Paper on "Railway rambles in the South-East Midlands," by Messrs. T. Summerson and J. E. Rounthwaite.

March 8 (*Fri.*).—Stephenson Locomotive Society, Scottish Centre, at 25, Charlotte Square, Edinburgh, at 7 p.m. Paper on "The N. E. Region of British Railways," by Mr. R. A. Savill.

March 9 (*Sat.*).—Stephenson Locomotive Society, Scottish Section, at 302, Buchanan Street, Glasgow, at 3 p.m. Paper on "The N. E. Region of British Railways," by Mr. R. A. Savill.

March 11 (*Mon.*).—Institute of Transport, at the Jarvis Hall (R.I.B.A.), 66, Portland Place, London, W.1., at 5.45 p.m. Paper on "Railway freight charges," by Mr. A. A. Harrison.

Railway Stock Market

Foreign rails held steady, and buyers were about for Nyasaland Railways £1 ordinary shares, which as compared with a week ago, have strengthened from 10s. 6d. to 11s. at which there is a yield of 6¼ per cent on the basis of last year's 3½ per cent dividend. The company's 3½ per cent debentures showed firmness at 58.

Canadian Pacifics, as usual, moved closely with Wall Street, and were again slightly down on balance at $59¼, compared with $59¾ a week ago, and are now not far short of their lowest price last year of $56. The highest was $68¾. At their present price there is a yield of 5½ per cent, which certainly seems attractive for a share that from the long term point of view offers one of the best ways of acquiring a financial interest in the future of Canada, and from the near-term point of view is a means of participating in the trend of Wall Street markets. Canadian Pacific preference shares and 4 per cent debentures held steady at £64¼ and £72½ respectively, while in other directions, White Pass shares at $18¼ were virtually the same as a week ago.

Peru Transport "B" shares were again fractionally below $1¼. Mexican Central "A" bearer debentures were maintained at £69.

Dorada ordinary stock came back 1½ points to 51 after the advance at the end of last week on news of the receipts of the sale money. The debentures were again quoted at 107½.

Antofagasta stocks remained active, but were again little changed in price on balance, the ordinary being 46½ and the preference 47, with the 5 per cent (Bolivia) debentures again quoted at 91½.

Taltal Railway and Nitrate Rails shares were again 11s. 6d. and 21s. 3d. respectively. San Paulo Railway 3s. units have again changed hands around par. Brazil Railway bonds kept at 5¾.

Paraguay Central prior stock was again 14 with Costa Rica ordinary stock 25 and the 6½ per cent first debentures 75. Chilean Northern debentures held at 44½. Business at 19¾ has been marked in United of Yucatan gold bonds and up to 22 in Wolmar Railway bonds.

Among shares of companies with locomotive and engineering interests the best feature has been an advance on balance from 53s. 9d. a week ago to 56s. 3d. in English Electric. This followed the increased profits for the past financial year, which prove to be the best in the company's history, and moreover, whereas the City was not expecting more than an unchanged 12½ per cent dividend, there is in fact an increase to 14 per cent. English Electric, of course, have varied and widespread interests, but those connected with locomotives expended substantially when control was obtained of Vulcan Foundry. Associated Electrical, like many other leading industrial shares, have moved lower with the general trend of markets, and declined on balance from 68s. to 66s. 9d., while General Electric eased from 56s. to 55s. 9d.

Beyer Peacock shares remained active, but at 44s. 3d. did not quite hold last week's further good rise. Hurst Nelson firmed up to 36s. 9d. at Glasgow, and elsewhere, Birmingham Carriage gained 6d. at 19s., while Gloucester Wagon 10s. shares were good, having risen on balance from 13s. 6d. to 14s. 6d. G. D. Peters shares remained very firmly held, and the lower quotation of 27s. 6d. did not appear to be adequately tested by dealings. North British Locomotive have changed hands around 13s. 4½d. Wagon Repairs 5s. shares held around 12s. 10½d., with Charles Roberts 5s. shares 11s. 9d. Vickers moved higher at 42s. 1½d., and in other directions, Westinghouse Brake (79s. 9d.) have been steady. There were small indefinite movements in steel shares.